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**T H E   G U M S ;**  
**WITH**  
**LATE DISCOVERIES**  
**ON THEIR**  
**S T R U C T U R E ,**  
**GROWTH, CONNECTIONS, DISEASES,**  
**AND**  
**SYMPATHIES.**



---

**By MR. GEORGE WAITE,**  
**MEMBER OF THE LONDON ROYAL COLLEGE OF SURGEONS.**

---

*Quid evenit postea, nescio:—CICERO, PHILLIP II.*

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**LONDON :**  
**LONGMAN, REES, ORME, BROWN, GREEN, AND**  
**LONGMAN,**  
**PATERNOSTER-ROW.**

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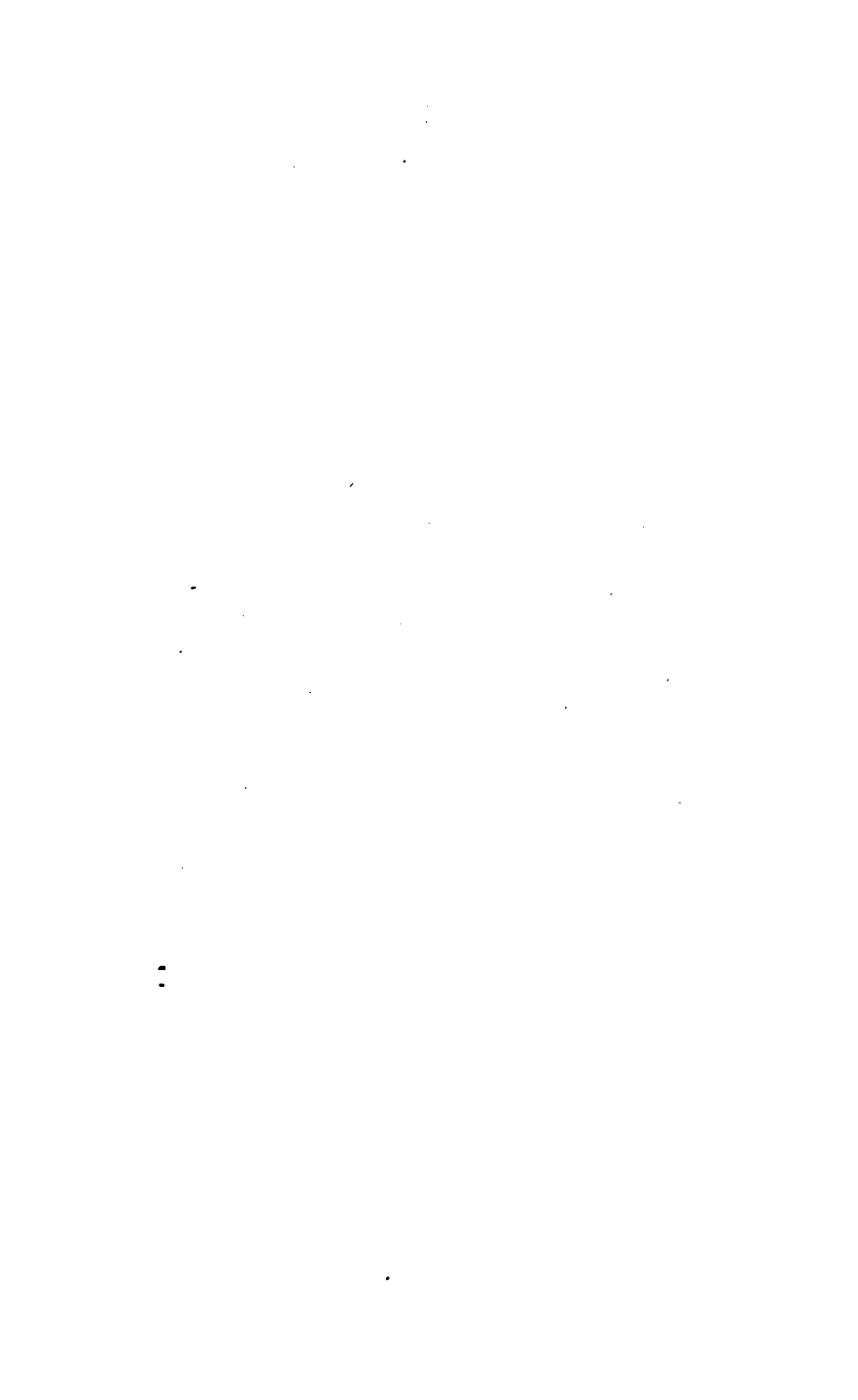
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THOMS,  
PRINTS, 12, WARWICK SQUARE.

This humble volume, the author, in grateful remembrance of a kind, patient, and distinguished patron, was but a few weeks since permitted to dedicate to the venerable EARL SPENCER : it is now offered as a respectful tribute to his memory. His private virtues will ever live in the vivid recollection of those who knew him, and his loss the literary world will long have just reason to deplore.





## PREFACE.

---

I HAD purposed, two years since, arranging in a new classification the diseases of gums and teeth. My health becoming impaired from an injury on the head, I was prevented the accomplishment of this object. Many new ideas having arisen on the sympathy between the gums and the constitution, and having myself been instrumental to their furtherance, it was suggested to me that the accompanying remarks ought to be given publicity as early as possible.

Comparing the teeth to the vegetable kingdom, I have ventured to give them four seasons, agreeably to the cardinal laws. The construction of the gums from whence these teeth emerge, and

beneath which they lie concealed, is like that soil to which the agriculturist and arborist devote their toils and cares. I have described the carotid arteries, and the sympathetic and par vagum nerves, as also the vital properties, for these are essential to understand the diseases and sympathies of the gums.

To those persons who make the teeth their principal study I would recommend an intimate knowledge of the pathology of our frame; this alone will guide them in the diseases of the teeth, and teach them whether such are congenital, inflammatory, or sympathetic with other affections. It will also show them that the works of art cannot compete with those of nature, and, impressing on their minds the reality of this conviction, point out to them that nothing so shows the ignorance of the present dentists as the manner in which false teeth have gained ground during the latter years.

To the medical world, with all respect to their

great exertions and talents, I would submit the teeth as organs most essentially conducive through life to a healthy temperament and digestion; their early development and the irritation often attending them as dangerous in the extreme, as producing fevers, eruptive diseases, hydrocephalus, diseases of the lungs, of the mucous surfaces, and of the glandular system, often bringing on deafness and defective vision, rousing also predispositions which else would have remained dormant in the frame.

To society in general, wherein enlightened ideas are becoming more and more diffused, I would recommend due attention to the condition of the gums; this attention, if properly directed, will quite prevent the occurrence of those decays too often seen in the mouths of our young females, who might else be as the Roman pontifex said of captured youths of ancient Britain, "*Non angli sed angeli.*"

Lastly, I have endeavoured to point out, that

till the latest period of our lives, the condition of the teeth depends on that of the gum, and, unless due regard be paid to this point, the most talented operations on them will too frequently be found of little or no avail; the ends for which we intended these operations will become defeated, and the teeth, even if no decay has existed in them, loosening one after the other, will often fall out from the gum.

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## ERRATA.

Page 5, line 10, *for wisdom read praises.*  
Page 9, line 5, *for digestive read digastric.*  
Page 12, line 25, *for plotysmæ read platysma.*  
Page 19, line 12, *for porticum read posticum.*  
Page 30, line 12, *for cavernus read cavernous.*  
In the quotation on the passions, 6th line, *read*  
Absence, distrust, or e'en with anxious joy.





# THE G U M S

IN

## THE DIFFERENT PERIODS OF LIFE.

---

IN the primary stages of formation the construction of our bodies is separate; but, when the earliest periods of our existence have passed, these separate portions becoming intimately blended together constitute one harmonious whole.

The brain, destined to be the *primum mobile* of our frame, as well as the seat of our understanding, is the first portion of the system to be constructed. It is contained within a series of vascular and important membranes, between the two most external of which the bones of the head are secreted.

The next part is the face, which appears with two small black spots for the eyes; we then gradually see the other parts of the body forming, and, when development of the various parts takes place, they increase in bulk.

B

When the necessary period of birth arrives, man receives his new existence ; the lungs, which were in a state of collapse, now become filled with atmospheric air, and occupy the entire cavity of the chest; the function of respiration then takes place, the thymous gland in the anterior and superior part of the chest now begins to disappear, the jaws lengthen in order to accommodate the formation of teeth, which is destined to commence within them.

The developement of the gums, and the offices they perform, are as we go on in life of the greatest possible import to the health. They have attached to them the highest attributes of superior intent and dispensation. If the known phenomena of the heavens, with the various changes of constellations, open to learned eyes a vista into futurity,—or if facts connected with geology call the contemplation to the highest and most unattainable objects,—to the same ends will the design perceptible in the growth and successive changes of the gums lead the scientific mind.

However insignificant these organs may appear, compared to the vast grandeur and magnificence of the considerations with which the mind is overwhelmed when considering the mechanism of the heavens and the wonders of the universe, still the gums can claim merit as exhibiting phenomena both clear and comprehensive. We may refer to the tender gum, destined by Providence to touch the still more tender nipple, the growth and

expansion as the infant gains size, the graceful and semicircular manner in which they throw out the beautiful colour of the teeth, the influence they possess through life over them, and finally, when the teeth no longer exist, the compensative powers with which they are endowed, and the extreme hardness they are often known to assume.

The wisdom of divine œconomy, evident in all its works, must fill the mind with mingled feelings of awe and admiration. To sing the wisdom of his God, the royal psalmist tuned his harp to the enchanting strains of Hebrew poesy ; the pagan, unilluminated by the fiery pillar of revelation, and taught only by the voice of nature, was compelled to confess the existence of an all-wise and all-gracious Supreme.

Meditating on the order and offices of various parts of the heavenly bodies, contemplating the rise, the expansion and succession of plants, we may consider the numerous stupendous chemical and mechanical operations perpetually going on in the sphere of our existence, and we cannot fail

“ To look from nature up to nature’s God.”

If then thus admirable and superior to all comprehension be the functions of those objects of the creation destined for the use and happiness of man, we should expect to find all parts of his formation neither less wonderful nor less sublime.

At first man appears in all the impotency of his infantine state, without many of those organs which his future life will demand: these he receives by gradated accession. When the weakness of infancy yields to the succeeding state, and the frame no longer needs the most delicate support, teeth are given him for his new condition: these, in conjunction with other organs, are most strikingly adapted to the exigencies required; they are the coadjutors in one of the noblest characteristics of our distinguished scale in the creation, and the almost indispensable organs of one of the primary objects of animal life.

Nature, or rather the omnipotent author of nature, is no less sublimely wise in the minor and individual objects of the creation than in those cardinal ones which are common and universal. The regulation and succession of plants is in accordance with the temperature most congenial to them. The due and imperturbable order of the seasons, the rise and decline of the year, are not less wonderful than the dispensation in the condition of the gums. In spring, when, to borrow the words of the author of the "Seasons,"—

" Surly winter passes off  
Far to the north, and calls his ruffian blasts,"

the welcomed early plants present their tender heads above the surface of the nurturing earth; so, too, in infancy, when the early winter has passed away, the

teeth rise from the tender gum. Infancy also has its succeeding state when these organs experience a revolution. When summer has run her course, autumn appears, then botanical nature gives indication of her approaching dissolution; here likewise we have the resemblance of our natures. Well then has Sophocles said,—

“ οὐκ ἂν πρίαμην οὐδενὸς λόγου βροτὸν  
δοσις κεναῖσιν ἐλπίσιν θερμαίνεται.”

Winter then appears,—

“ Sullen and sad, with all its rising train,  
Vapours and clouds and storms.”

Winter, the universal emblem of advanced old age. In the one, the trees, the herbs fall and decay; and in the other, the gums and teeth, in sympathy with their co-operating organs, fall, and falling rise no more—

“ ἐπάμεροι, τί δέ τις; τί δ’ οὐτις;  
Σκιᾷς θναρ, ἀνθρώποι.”—*Pindar.*

Since then four periods of life exist, coeval with the seasons of the year, so each approaching season brings its train of circumstances with it. These periods in the mouth are extremely well defined. Youth and old age have the intervention of summer and autumn, and the interposing secondary and tertian portions have the ac-

companying changes of life, which take place about the sixteenth year, and again show themselves when spring and summer have passed away.

It is impossible to draw any just conclusion as to the real nature of the gums by looking promiscuously at them. The inferences drawn in such a case would be entirely wrong; for by far the greater proportion of gums are in an unsound and unhealthy state. These diseased appearances differing in themselves, it is only by comparison with different individuals that an exact knowledge of what they should be is imbibed.

We find the diseased appearances ever in conformity with the health and temperament of different individuals. In the healthy state they are much more cartilaginous than fibrous, and possess a reddish appearance, which indicates the existence of a circulating medium, having the papillæ of numerous little secreting ducts opening on their surfaces. In the diseased state they become sensitive, assume a darkened colour, and swell; whereas before they were almost even with the surfaces of the teeth.

It is not to be presumed that a person who is continually in the habit of seeing unhealthy gums is likely to form a just estimate of their aggregate nature. Physiological points give us, however, some conception of their healthy state, and comparative anatomy also draws away a veil which might else obscure what in reality they should be. Without progressively following down

the scale of animal existence, we may consider merely the mammalia and feræ; we find their gums hard and cartilaginous, rarely swollen, but when too much pampered in the luxuries of man.

Although in refutation of this doctrine it may be urged that the different methods of gaining sustenance which animals possess require their gums to be firm and hard, still in the same method of reasoning the action of mastication in man demands a similar structure of these organs. With this structure they were originally sent forth; but in proportion as luxuries bring on disease, which lays hold of the frame, so the gums put on changes consequent on the various alterations of habit. Hereditary predispositions, following each other in mournful succession, are too often seen desolating the human frame, and the blood changed into impurity shows its real nature by choking up the delicate network of vessels which enter into the structure of these organs.

The manner in which the gums partake of the various changes of habit is well worthy of consideration; but as yet this subject has been much underrated, if not entirely neglected, by our pathologists. Before proceeding further, it will be necessary to explain the various parts in contact with the gums.



## THE GUMS.

THE gums covering the superior maxillary bone are reflected over its anterior lateral and inferior parts; they pass between the interstices of the teeth up to the roof of the mouth, cover the tuberos process, and terminate in the soft palate and constrictors of the fauces.

In the inferior maxillary bone they pass in a similar manner, being perforated by the teeth. They proceed backwards as far as the root of the coronoid process, terminating externally in the inner substance of the cheek, and internally in the root of the tongue.

The gums cover the dental processes, and increase in vascularity as they proceed backwards and away from the necks of the teeth. Small vessels pass from the gums into the periosteum and into the bone, and on the surfaces of the gums are the openings of small secreting ducts. On examining the gums at the necks of the teeth, they are found embracing the tooth very firmly, and connected to a membrane of great importance, the periosteum dentium.

In proportion as the bony fabric of the jaws progresses in its usual developement, so the substance of the

gum also increases in proportion to such developement. This consideration has recently called forth doctrines of high importance, which we must hereafter refer to.

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### PERIOSTEUM DENTII

Is the intervening membrane situated between the septa dentium and roots of the teeth. It is found to be very firmly connected to the gums, and small vessels from them to it penetrate the substance of the root.

The intervention of this membrane serves to retain the teeth firmly in the socket. In pivoting teeth, when the grand object is entirely to destroy life in the root, we see proofs substantiated of the great power which the periosteum possesses over the consolidation of the portion of the root.

Such tenacity to the socket does the periosteum give the root of the tooth that a few mere intervening filaments to its bone serve for years to prevent it dropping out. In cases of loose teeth, numerous are the records which exist of their remaining loose in the mouth, when for years each succeeding day has been apparently their last.

It would be impossible that the conical shape of the

root of a tooth could at all influence the manner in which its tenacity to the socket is preserved; the periosteum is a very principal agent in producing this effect; to preserve this membrane in a healthy state becomes an object of paramount importance.

As it derives vessels from the gums it must necessarily be acted on by all causes which produce a diseased state of these organs; when therefore the gums swell, the swelling produces a singular effect on the teeth; they become raised from their original position, and in closing the mouth are the first touched by the opposing row.

After pivoting teeth this becomes a great consideration.. It was necessary that the replaced tooth should be so left that no part of it touched the opposing teeth of the bottom row, even in their most rotatory motions. By inflammation, which frequently follows the operation, the root drops, and being much in the way is extremely painful.

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## BLOOD-VESSELS

CONNECTED WITH

### THE INTERIOR OF THE MOUTH.

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#### THE ARTERIES.

In my former work, the Surgeon-Dentist's Manual, I have described the nature and uses of the arteries and veins, as well as those which are intimately connected with the teeth. I shall here go a little further into the subject, and cannot do better than trace the course and branches of the external carotid arteries, which supply the mouth and its adjacent parts with arterial blood.

The external CAROTID ARTERY is smaller than the cerebral or internal carotid, during the age of infancy ; but in adult age they become of equal magnitude. It is continued from the point of its division as high as the cervix of the condyloid process of the inferior maxillary bone, where it terminates by dividing into the temporal and internal maxillary branches. At first it is situated anteriorly, and towards the inner side of the internal carotid or cerebral artery, but soon crosses it, inclining backwards, and subsequently slightly curves as it

ascends to the point of its division. For a space of about a quarter of an inch after it arises, it has no other covering than the platisma myoides, fascia, and a portion of common integument: it then passes beneath the digestive and stylo-hyoideus \* muscles, near the angle of the lower jaw, as well as the lingual nerve; it then continues its course between the sterno-cleido-mastoideus, the mastoid process of the temporal bone, the ear, and the angles of the lower jaw, where it is covered by the parotid gland, in which it finally becomes imbedded. The stylo-glossus and stylo-pharyngeus, with the laryngeal nerve, run between it and the internal carotid artery, supporting it, or at least partially so, until it reaches the gland. It gives off eight branches.

1. The RAMUS THYROIDEUS SUPERIOR arises usually from the commencement of the external carotid artery, occasionally from the common carotid, and sometimes from a trunk common to it and the ramus lingualis. It varies much in size, and runs downwards and inwards in a serpentine direction, to the upper border of the thyroid cartilage. It then descends a little in order to reach the thyroid gland, and divides into two branches. It is at first covered only by the fasciæ and plotysmæ-myoides, but subsequently by the sterno-cleido-mastoideus, omo-hyoideus, and sterno-thyroideus muscles, inclining inwards towards the superior part of the thyroid gland.

\* Syn. Stylo-Lingualis.—Dewhurst.

*a.* The *Ramusculus Thyroideus Superior* is the continuation of the trunk, running to the thyroid gland; it inosculates with the same branch from the opposite side, and likewise with the *inferior thyroideal branch* of the subclavian artery.

*b.* The *Ramusculus Laryngeus Internus* is distributed to the arytaenoid cartilages and epiglottis. It enters the organ of voice, attended by the *ramus laryngeus internus nervi vagi*, between the cornu of the os hyoides and thyroid cartilage: sometimes this branch arises from the external carotid artery.

2. The *Ramus Lingualis* is somewhat larger than the *ramus thyroideus superior*; it arises commonly just above the thyroïdal, and sometimes from the trunk of the external maxillary; it passes in a very tortuous manner upwards, inwards, and forwards, to the cornu of the os hyoides, where it passes beneath the hyoglossus, and the middle constrictor muscle of the pharynx; the former muscle parts it from the lingual nerve. Thus far the direction of the vessel is horizontal, but it soon ascends in an almost perpendicular direction, being covered by the digastric, mylo-hyoid, and genio-hyoïdal muscles, and ultimately changes its course to run directly forwards beneath the tongue, where it assumes the name of the *Ramusculus Raninus*. It gives off the following branches:—

*a.* The *Ramusculus Hyoideus* takes the direction of the os linguale, and, running towards its superior border,

forms an arch by inosculation with the corresponding vessel of the opposite side; it gives off several minute ramifications to the contiguous muscles and integuments.

*b. The Ramusculi Dorsales Linguae.* These are one or two in number, which take their origin where the artery is deep seated, and inclining upwards and backwards, covered by the hyo-glossus muscle. They are destined to ramify on the substance of the tongue, as far back as the root.

At the anterior border of the hyo-glossus muscle, the lingual artery may be considered to divide into—

*c. The Ramusculus Raninus*, which is the proper continuation of the trunk, passing forwards to the tongue, beneath the lingualis muscle, and close to the outside of the genio-glossus, and finally near the tip of the tongue, contiguous to the frænum; it terminates in an arch, by inosculating with the corresponding artery of the same name on the opposite side.

*d. The Ramusculus Sublingualis\** passes between the genio-hyoïdeus and the sublingual gland, and, after piercing the mylo-lingualis, reaches the chin, where it gives off several small branches. In its course it supplies the sublingual gland, as well as the muscles passing between the chin and jaw to the tongue; it is sometimes larger than usual, and it will be found to

\* Syn. Ramus Sublingualis.

supply the place of the *ramusculus submentalis*, and is in its turn supplied by that vessel, when deficient.

3. The *RAMUS MAXILLARIS EXTERNUS*\* is generally the largest of the three branches, and has its origin a little above the lingual branch. It passes upwards and forwards under the jaw, behind the *platysma-myoides*, the tendon of the *digastricus*, and the *stylo-hyoideus*, but it rests on the external surface of the jaw-bone, being only covered by the integument and the *platysma*, and, being close to the margin of the *masseter* muscle, its pulsation can easily be felt. The artery thence ascends, inclining towards the angle of the mouth, being covered partly by the *depressor anguli oris*, and the *zygomatichi*. It is very tortuous in its ascent, and then turns down, running in its groove to the superior surface of the submaxillary gland, as far as the margin of the jaw, over which it coils in order to reach the sides of the face. Becoming diminished in size, it proceeds to the internal canthus of the eye, by the side of the nose. It gives off the following branches :—

a. The *Ramusculus Palatinus Inferior* † passes to the posterior part of the mouth, supplying ramifications to the tonsils, styloid muscles, and eustachian tube, the pharynx, the *pendulum palati*, and adjacent parts. It ultimately inosculates with

b. The *Ramusculus Tonsillaris*, which ascends by

\* *Arteria Facialis, vel Maxillaris Externa.*

† *Arteria Palatina Inferior.*



the stylo-glossus to the side of the pharynx, and terminates by dividing into several small branches, which are distributed to the tonsils and sides of the tongue.

c. The *Ramusculi Submaxillares* consist of a fasciculus of small ramifications, which pass into the substance of the submaxillary gland, whilst the artery is in contact with it; some of these are prolonged to the side of the tongue.

d. The *Ramusculus Submentalis* \* departs from the artery near its turn round the jaw, runs forwards between the mylo-lingualis and digastric muscles. It is covered by the submaxillary gland, and, after giving off some ramifications to the gland and neighbouring parts, it divides at the symphysis of the chin into two smaller branches, one of which, the *R. Superficialis*, passes between the depressor labii inferioris and the skin supplying both, whilst the *R. Profundus* is situated between that muscle and the bone, sending ramifications to the substance of the lips, and inosculating with the *Ramusculus Mentalis* of the internal maxillary branch, just as it leaves the canalis mentalis. This and the *R. Palatinus inferior* are given off previously to the artery passing over the base of the lower jaw.

e. The *Ramusculus Labialis Inferior* † inclines somewhat inwards, and distributes its ramifications to

\* SYN. Arteria Submentalis.

† SYN. R. Superficialis.

the muscles of the lower lip, and forms free inosculation at the symphysis of the lower jaw.

*f.* The *Ramusculus Coronarius Labii Inferioris*\* originates near to the angle of the mouth, runs in a tortuous and transverse course upon the mucous membrane, is concealed by the labial muscles, in the centre of which it inosculates with the corresponding artery of the opposite side. Some of its ramifications pass upwards into the orbicular and depressor muscles of the chin, inosculating with the branches that ramify there.

*g.* The *Ramusculus Coronarius Labii Superioris* is larger and more tortuous than the preceding, above which it arises, taking a similar course as it proceeds inwards across the upper lip. It passes beneath the corner of the zygomatic and orbicular muscles, and forming an arch by inosculating with the corresponding one upon the opposite side.

*h.* The *Ramusculi Buccales* ramify on and in the substance of the cheeks.

*i.* The *Ramusculus Nasalis Septi* ramifies on the septum nasi.

*k.* The *Ramusculus Nasalis Lateralis* is distributed on the alæ nasi, with those produced by the inosculation of the ramusculus angularis, and with the ramusculus frontalis e ramo-ophthalmico arteriæ cerebralis.

*l.* The *Ramusculus Nasalis Anterior* is distributed to the anterior part of the nose.

\* Arteria Coronaria Labii Inferioris.

*m. The Ramusculus Angularis* is the continuation of the trunk ; it passes to the inner canthus of the eye, where it inosculates with the anterior nasal twig of the ophthalmic branch of the external carotid, also with the ramusculus transversalis faciei, and ultimately with the frontal twig of the temporal artery.

4. The **RAMUS PHARYNGEUS ASCENDENS HALLEI.** This is the smallest branch of the carotid. It arises from the commencement of the external carotid, and ascends in the same direction between it and the pharynx ; it sends a few branches to the muscles of the pharynx, and then enters the cranium, at the foramen lacerum anticum, terminating on and supplying the dura mater, and then becomes the anterior meningeal artery.

The **RAMUS POSTERIOR AURIS** is smaller, and rises higher than the former : it is often a branch of the ramus occipitalis ; it passes on the posterior part of the external ear and external carotid, beneath the parotid gland, and inosculates with the temporal branches ; it gives off one very small branch, called the ramusculus stylo-mastoideus ; this goes to supply the parts occupied by the nervus communicans faciei.

*The Oral Branches of the Temporal Artery.* The ramusculus transversalis faciei is given off as it passes through the parotid gland, runs parallel with and above the stensonian duct, across the masseter muscle, accompanied by a branch of the nervus communicans faciei,

and inosculates with a variety of vessels which are contiguous to it.

*Oral Branches of the Internal Maxillary Artery.*—

*Ramusculus maxillaris inferior* passes down between the pterygoidei muscles, enters the lower jaw at the foramen *maxillare posticum*, runs along to canalis mentalis, and passes out at the foramen maxillare anticum ; it inosculates with the inferior labial and submental arteries.

The *Ramusculus Pterygo-Palatinus* passes through the canalis pterygo-palatinus, and enters the mouth by the foramen palatinum porticum, and supplies the gums and interior of the teeth ; it is distributed to the roof along the alveolar processes, and inosculates with the R. nasalis posterior.

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## II.—THE VEINS OF THE HEAD, FACE, AND NECK.

The veins of the head are very few in number, and are all of but little moment to the operating surgeon. The veins returning the blood from the head and part of the neck are united into the following trunks, viz.

The *VENA FACIALIS* is formed by the frontal vein, and by an intricate plexus of branches upon the face.

It winds obliquely outwards and downwards at a distance from the artery; but, in crossing the jaw, goes close by the outside of it, and terminates in the external jugular vein.

The *VENA OPHTHALMICA* receives the blood from the orbit, and from the vessels of the eye and eyelids, by the *venæ vorticosæ*; it communicates with the *vena frontalis*, posteriorly with the *sinus cavernosus*, and with the *vena angularis*.

The *VENA ANGULARIS* is situated at the internal canthus of the eye, communicating superiorly with the *vena frontalis* and the orbits, by means of the *vena ophthalmica*. The late Joshua Brookes was in the habit of bleeding occasionally from this vein in cases of ophthalmia.

The *VENA MAXILLARIS* passes from the inner canthus of the eye, and immediately along the anterior part of the masseter muscle, towards the angle of the lower jaw, where it terminates in the jugular vein.

The *VENA TEMPORALIS* is formed by superficial and deep-seated branches from the sides and superior part of the head, and running down upon the temple at some distance from the artery. These branches of the temporal vein form large inosculations, anteriorly with those of the frontal vein, above with their fellows on the opposite side, and posteriorly with the branches of the occipital vein. The trunk ascends at the anterior part of the ear, and along with the artery sinks into the

substance of the parotid gland. In its descent before the meatus auditorius externus, it receives branches from the ear, cheek, and parotid gland, corresponding to arteries of the same parts. At the under part of the lower jaw, the facial and temporal veins commonly unite, and form the external jugular vein. Small veins from the pharynx, the internal maxillary veins, and the occipital, empty themselves into the internal jugular.

The *VENA LINGUALIS* sometimes terminates in the external jugular: one branch of this, the *vena ranina*, is seen under the tongue. The *vena laryngea superior*, and sometimes the *vena laryngea inferior*, terminate in this vein, but they generally enter the subclavian or top of the cava.

The *INTERNAL JUGULAR* also receives branches from the muscles and adjacent parts in the neck, and at length terminates in the *vena subclavia*.

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### III.—THE ABSORBENTS.

The lymphatics on the outside of the head accompany the blood-vessels, and pass through glands in their way to the neck. Those accompanying the temporal artery go through small glands connected with the

parotid gland, and also through others connected with the root of the zygoma. Those which accompany the occipital blood-vessels penetrate one or two minute glands, placed a little posteriorly to the ear, and over the mastoid process of the temporal bone. The lymphatics proceeding from the different parts of the face accompany the branches and trunk of the maxillary artery. Some of them pass through glands situated upon the outside of the buccinator, while the principal trunks pass through a number of large glands placed upon the outer and inner part of the lower jaw, at the anterior edge of the masseter, and about the inferior maxillary gland.

The lymphatics from the inner part of the nose principally run in company with the internal maxillary artery, and pass through glands situated behind the angle of the lower jaw, where they are joined by those belonging to the inner parts of the mouth. The lymphatics of the tongue, and likewise those of the muscles, and about the other parts of the os linguale, enter the glands placed behind the angle of the lower jaw. From the superficial and deep-seated parts of the head the lymphatics generally accompany the external and internal jugular veins and the carotid arteries, receiving at the same time branches from the larynx, pharynx, muscles, and other parts of the neck. The principal part of the lymphatics go along with the internal jugular vein and the carotid artery, and in their passage form a

remarkable plexus, which goes through the numerous glands seated near the blood-vessels, composing a chain, from which they are termed *concatenatæ*. These are more numerous than any others in the body, excepting the mesenteric. The cervical plexus of lymphatics having passed through these glands, and having received some branches from the interior part of the thorax and axillary glands, unite at the bottom of the neck into a trunk, and sometimes two, which in the left side enters the ductus thoracicus near its termination, and on the right goes into the trunk, forming the general termination on that side. Ultimately this duct enters the left subclavian vein.

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#### IV.—THE MUCOUS MEMBRANE OF THE MOUTH.

On examining the mouth, we perceive the gums to be enveloped by a continuous reflection of the mucous membrane of that cavity, or, as it is generally denominated, the *buccal membrane*, it being in fact a portion of the alimentary canal, and also the commencement of the mucous membrane of the whole tube. It exhibits great resemblance to the peritoneum in its



numerous reflections within the abdominal cavity, although differing very widely from it in its nature; this being a mucous membrane, whilst that forming the peritoneum belongs to the class of *serous* membranes. It may perhaps not be inappropriate if we detail a brief account of the course and nature of the mucous membrane itself, and the various appearances it assumes throughout the whole of the alimentary canal, whereby the reader will perceive that in consequence of the numerous diseases which the digestive organs are subjected to, the morbid effects upon the gums may be easily accounted for.

As I have already observed, the mucous membrane constitutes a most extensive but continuous tube from the mouth through the intestines, and is united to the external organs and surrounding tissues by means of delicate cellular substance, but on the interior it presents a moist surface, lubricated by the mucus which it secretes. If, however, we carefully examine it, and investigate its whole extent, we find it exhibiting a considerable resemblance to the peritoneum, both in its appearance and the characteristics it assumes in different parts through which it passes. For example, the epidermis, which we may trace from the lips into the mouth, from the sides of which it is reflected over the gums, tongue, soft palate, &c., may be found continued as far as the connection of the *æsofagus* with the stomach. However, we find it considerably thicker in the *nasal fossæ* than

it is elsewhere, it being soft and pulpy, but very closely adhering to the periosteum. It becomes extremely smooth in the pharynx, and is almost destitute of *villi* on its surface; it, however, exhibits considerable vascularity, and is of a deep reddish hue. A different arrangement occurs in the *œsophagus*, where we find it pale, thin, and forming longitudinal folds. In consequence of the contraction of the muscular fibres, it is evidently less vascular than the pharyngeal portion, and has not so many mucous glands. It becomes still paler as it approaches towards the cardiac orifice of the stomach; but, according to the observations of Dr. Yellowley,\* it gradually becomes tinged as it becomes prolonged into the stomach into a roseate hue, particularly towards the splenic extremity and the greater curvature. The *valvulæ conniventes*, in the small intestines, are formed by the duplicatures of this membrane, which diminish gradually in their number as they proceed from above downwards, and in the larger intestines they are not visible. In the course of this membrane several valves are to be observed at the interior of several parts of the alimentary canal, which are denominated in accordance with either their situation or the office they perform, among which I may mention the *velum pendulum palati*, the *valvula Ileocolica*, the *pylorus*, or *gastro-duodenal valve*, together with the *valvulæ conniventes*, already noticed.

\* Medico Chirurg. Transactions.

To these may be added the *rugæ* of the stomach and intestines, which vary in number, and may either be increased or diminished, as the stomach may be full or otherwise. Besides these, there are several minute, delicate processes, and *fossæ* connected with this membrane, which are well deserving of attention.

We find the whole of this mucous surface studded over with a great number of fine *villi*, of a conical shape; the summit of each exhibits a minute orifice, which leads to an absorbent vessel. Dr. Quain, however, doubts the accuracy of this statement, and believes them to be more of a laminated appearance than of a conical conformation, and states further that they are equally destitute of pores or apertures.\* An immense number of papillæ are diffused, bearing some analogy in their structure to those we find on the surface of the tongue, but are of considerably smaller dimensions, and appear to be calculated to increase the extent of the absorbing surfaces. In many parts of its extent we find the mucous membrane elevated by small *granules* beneath it, the number and dimensions of which greatly vary in accordance to the parts in which they are found. For the most part these are convex and lenticular, possessing a minute pore on their external surface, and which answers the purpose of an excretory duct for the mucus it secretes. These granules are usually comprehended under the general tenour of *mucous granules*,

\* Elements of Anatomy.

*glands*, or *follicles*, and bear the name of the two anatomists who first described them. At the pyloric orifice of the duodenum these glands, although very numerous, are yet detached from each other at small intervals, hence they have been named *glandulæ solitariae*, and, in honour to their discoverer, *glandulæ Brunneri*: towards the termination of the duodenum they diminish considerably in number. Another set is divided into determinate series or groups, and first make their appearance in the jejunum, and about the inferior portion of the ileum become exceedingly numerous; these are called the glands of Peyer,—a term which, with that of the other set, ought to be abolished, and more appropriate ones substituted.

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### THE GREAT SYMPATHETIC NERVE.

We must now consider other organs which, in the sympathy existing between constitutional disease and the gums, are of the highest import to be correctly understood, I allude to the great sympathetic nerve and the *par vaga*. An increased vascularity of the gum being dependent on a disorganized state of the blood, and on increased arterial action, it is easy to conceive

that the functions of the nerves supplying the gums become impaired when any thing occurs to interrupt the vital energy. I need scarcely say that through the brain the various nerves receive each their separate functions, the olfactory, the optic, the pathetic, the trigeminum, the ophthalmic, and the auditory, each connected with the brain, and receiving and transmitting its impressions accordingly. It is not our place here to consider how or in what manner such sensations are conveyed from the brain to the various nerves, in order to put in action the separate functions allotted to each ; such points are involved in much obscurity.

As to the influence which sudden impressions of the mind have on the digestion, this may be clearly understood. Jaundice has been frequently produced by sudden impressions of grief ; numerous are records of other contingencies occurring, the effects of sudden nervous impressions.

In derangement of stomach as well as of mind the gums sympathize greatly through nervous influence.

In constitutions of extreme sensitiveness and sensibility the gums and teeth partake of the general feeling ; this is a fact in pains of the teeth well worthy of philosophic consideration. This is the cause why we may perform an operation on the tooth of one person, when the same operation in another person's tooth is far too sensitive to endure. See the constitution in which nervous sensibility may have been roused with-

ing with agony, when even a delicate handkerchief may have had contact with a tooth. Let the physiologist watch the muscles of expression when any harsh substance may have rubbed the enamel of a tooth belonging to such a constitution. Let him go further, and even name to a person of extreme sensibility the circumstance of a substance of a harsh nature touching the enamel, and he will perceive on the face an involuntary shiver. On the other hand, we meet with persons living in the open air, and of hardy habits, whose teeth are outwardly unpossessed of sensibility.

“ Oh fortunatos nimium, sua si bona norint  
Agricolas, quibus ipsa, procul discordibus armis,  
Fundit humo facilem victum justissima tellus !”

All this will lead us to the vast import of the doctrines of neurology, and at the same time deeply into the laws of sensibility, if we wish for a thorough knowledge of the mouth.

In doctrines which have lately been propagated, many curious cases are on record of paralysis of certain nerves being caused by a pressure on others.

There is a celebrated case known in London of pressure of the maxillary nerves causing paralysis of the leg. I saw a case in Paris which was more comprehensible ; this was paralysis of the arm. I am indebted to my talented friend, Mr. Hunt, of Lower Brook Street, for two cases where there also existed paralysis by pressure on the maxillary nerves.

After these observations, I hope to be excused for describing the course of the great sympathetic nerve.

The ophthalmic ganglion is placed within the orbit occupying the external side of the optic nerve, and communicating by means of its posterior and inferior angle with the common oculo muscular nerve by means of a small twig, which is in general thick and short. By its posterior and superior angle it communicates with the *Surculus Nasalis e Ramo Ophthalmico Willisii*, through the means of a long and slender filament. I have never observed the ganglion ophthalmicum communicate with the cavernus plexus, nor the communication which Arnold states as existing between the ganglion meckeli and the one here described. The ciliary nerves take their origin from the ganglion ophthalmicum to the number of fourteen or fifteen; these nerves are extremely flexuous, and are disposed into two distinct parcels around the optic nerve, until they reach the posterior portion of the eye; then traversing the tunica sclerotica, distribute themselves over the ciliary ligament and the iris. During their passage along the optic nerve they often unite, and not unfrequently form one, two, and even three small ganglions.

The ganglion meckeli, or the spheno-palatine, is situated in the summit of the fossa zygomatica; it is generally of a triangular form, but it is very variable in its configuration. Occasionally it is replaced by two or three particular enlargements, according to the num-

ber of branches, which, issuing from it, communicate with the superior maxillary. The ganglion meckeli sends off and receives from above two or three filaments, which form a means of communication with the superior maxillary. On its inferior side it furnishes three branches, which are denominated the palatine nerves. The principal one enters the posterior palatine canal; the others go to the velum pendulum palati, and also to the tonsils. Very often one or two twigs issue from the anterior part of the ganglion meckeli, in order to unite with a twig which descends from the superior maxillary, and forming with it a small ganglion, the twigs of which pass into the maxillary bone.

The internal branches are three in number, but become lost in the nasal fossa and pharynx, one called the *nasopalatine* enters the fossa through the foramen sphenopalatinum; it traverses the arch of this cavity, and is fixed to the velum pendulum palati. Obliquely descending posteriorly, it passes forwards to the anterior palatine canal, where it is connected with the branch from the opposite side. Prior to their entering this canal, sometimes we perceive a slight ganglionic enlargement at the point of this union. From this enlargement, or rather from the trunk which results from the union of the two nerves, four or five small ramusculi take their origin, and are distributed over the palatine membrane and also over the delicate tissue of the gums. The slight enlargement which I have just described, Mons.



Hyppolyte Cloquet has given the name of *naso-palatine ganglion*.

From the posterior surface of this ganglion the *vidian twig* of the *pterygoid filament* takes its origin. This important branch extends from the anterior to the posterior part of the *canalis vidianus ossis sphenoidalis*, and when it arrives at the posterior part of this canal it divides into two or three small twigs, but more generally into two; when there are three, two of them enter the *canalis caroticus*, and connect themselves with the ascending branches of the superior cervical ganglion. In some instances we find that one of them receives the petrous branch, discovered by Dr. Jacobson of Copenhagen. The superior is deemed to be the continuation of the vidian twig, inasmuch as it enters the cranium by means of the *foramen lacerum anterius*, and passes over the cerebral or internal carotid artery, becomes situated between two laminæ of the *dura-mater*, in order to arrive at the anterior surface of the petrous process of the temporal bone. When it arrives at this part it passes along the channel which precedes the *hiatus fallopii*, and is soon lost upon the nerve in the *aquæductus fallopii*. Mons. H. Cloquet supposes that this branch of the nerve only unites itself with the facial to separate afterwards, under the name of the *chorda tympani*; but Mons. Manec states that from numerous dissections he considers the latter to be a branch of the facial, which differs entirely from the vidian by its

volume, its harder consistence, and its colour never inclining to red like the vidian.

The submaxillary ganglion is placed upon the internal face of the submaxillary gland, a little below the stylo-glossus muscle; it receives by its superior part two or three filaments, which come from the lingual branch of the inferior maxillary. From its anterior part spring many filaments, which go to this nerve, to the sublingual gland, and to the buccal mucous membrane. The inferior part of the same ganglion gives off small branches, which are distributed to the submaxillary gland, and communicate with the branches of the carotidian plexus, which accompanies the submental artery upon this gland.

The *superior cervical ganglion* is situated upon the anterior and lateral part of the second, third, and fourth cervical vertebræ, from which it is separated by the great straight anterior muscle; externally it corresponds with the internal jugular vein; internally with the cerebral or internal carotid artery; and anteriorly with the hypo-glossal, pneumo-gastric, and glosso-pharyngeal nerves. This ganglion furnishes five orders of branches.

*First.* The *Rami Superiores* are two in number, sometimes three are found; these are situated posteriorly to the internal carotid or cerebral artery; they mount upwards towards the *canalis caroticus*, which they penetrate and pass along it, twining round the artery. Whenever a single branch springs from the cervical ganglion, it always divides into two or three

filaments at the moment when it penetrates the *canalis caroticus*. These filaments, as in the first case, twine around the artery, and constitute a species of plexus, wherein is almost constantly found a long ganglion, denominated the *carotid ganglion*; when it arrives at the cavernous sinus these nerves form a plexus, bearing that name; from this organ two twigs separate, which vary in their dimensions, and communicate with the external *motor oculi*; another filament uniformly extends to the first branch of the trigeminal, and is united with either its trunk or its nasal ramification. Another filament arises from the same carotid plexus, and, attaching itself to the inferior part of the sixth pair, occasionally communicates with this nerve, and then, passing through the inferior part of the sphenoidal fissure, slides over the pterygoid processes, and is lost in the ganglion meckeli. It is probably this twig that Dr. Boch supposed was furnished by the external motor oculi. Other branches of the *carotid ganglion*, and of the cavernous plexus, accompany the internal carotid artery as far as its first and second division. I have already mentioned, when describing the new *vidian* twig, the filaments which it gives off for the carotidean canal, likewise the branch discovered by Dr. Jacobson, which goes thither; so that the *plexus cavernosus* is formed by the branches ascending from the superior cervical ganglion, one or two filaments from the vidian twig, and a very small one from the glosso-pharyngeal ganglion.

*Secondly.* The *Ramus Inferior*. This is rarely discovered double; it descends upon the great rectus muscle as far as the middle cervical ganglion, or the inferior; when the middle does not exist, several small twigs, the number of which vary, take their origin from its external side, communicating with the cervical nerves; its internal side likewise gives off some filaments, but these are far more slender; the one extending along the carotid, the other uniting with the superior cardiac nerve.

*Thirdly.* The *Rami Externi* are exceedingly variable in number; they communicate with the first, the second, and the third cervical pair; that passing to the first gives out a small twig, which anastomoses with the hypo-glossal and the nervous branch, and passes over to the transverse process of the atlas, and the others, which are very diminutive, pass to the great and little recti muscles.

*Fourthly.* The *Rami Interni* amount to seven or eight in number; they are soft and flexuous; the superior are oblique from above below; the others are almost transverse; they all go to the lateral parts of the pharynx; they anastomose with each other, and with the twigs of the glosso-pharyngeal, of the superior laryngeal, and the pneumo-gastric, to constitute the great pharyngeal plexus. From this plexus arise the branches which go to the constrictor muscles, and others which accompany the external carotid artery and its

branches. These may be followed until the third termination of this artery; those which follow the *ramus thyroïdeus superior* pass forwards as far as the crico-thyroïdeal membrane.

*Fifthly.* The *Rami Anteriores* are distinguished into the superior and inferior. The first communicates with the facial, the pneumo-gastric, and the hypoglossal. The inferior forms the roots of the superior cardiac nerves, which are most commonly three or four in number. Here only two are seen arising from the ganglion; they descend behind the pneumo-gastric nerve and the primitive carotid, uniting with a filament coming from the inner side of the superior branch, in order to constitute a single nerve, which unites with a branch of the recurrent; in passing downwards it gives off two or three *ramuli*, which go towards the primitive carotid. It is to be remembered that this superior branch is but seldom united with the other cardiac nerves.

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## THE PAR VAGUM AND PAR TRIGEMINUM.

The par vagum is the important division of the eighth pair. Deep under the lower jaw and mastoid

process, it is entangled with the glosso-pharyngeal, the spinal accessory, the sympathetic, the portio dura of the seventh pair, and the upper cervical nerves. It forms a ganglion behind the internal carotid artery, and sends off the pharyngeal nerves and the internal laryngeal.

The par vagum enters the thorax by passing before the subclavian artery, and divides into two branches. The main branch passes behind the root of the lungs, and ascending forms the recurrent nerve; it passes up on the right side behind the carotid artery, and on the left side, turning round the arch of the aorta, gives off filaments uniting with the great sympathetic. It continues its course upwards, sending branches to the œsophagus and thyroid glands, and filaments which pierce the cricoid and thyroid cartilages.

Having sent off the recurrent branch, the nerve descends by the side of the trachæa, and sends branches forming the anterior pulmonic plexus, and branches behind the root of the lungs, which constitute the posterior pulmonic plexus.

The trunks of the nerve passing up on each side of the œsophagus unite and split, forming a net-work, called the œsophagæal plexus. It pierces the diaphragm with the œsophagus, supplies the lesser arch of the stomach, sending branches to the cardiac extremity and other adjacent parts. Sir Charles Bell, on this nerve, says, "Thus we see that the par vagum has a most appropriate name, and that it is nearly as extensive in its

connections as the sympathetic itself. It is distributed to the oesophagus, pharynx, and larynx, to the thyroid gland, vessels of the neck and heart, to the lungs, liver, and spleen, stomach, duodenum, and sometimes to the diaphragm. The recollection of this distribution will explain to us many sympathies: for example, the hysterical affection of the throat when the stomach is distended with flatus, the exciting of vomiting by tickling the throat, the effect which vomiting has in diminishing the sense of suffocation, that state of the stomach which is found upon dissection to accompany hydrophobia, whether spontaneous or from the bite of a dog."

The par trigeminum is also well worthy to be referred to from the circumstance of its supplying the teeth, and from the important connections it has with the sympathetic, cervical, and other nerves.\*

In the seventh pair of nerves it may be necessary to observe the portio mollis and the portio dura: the former is the acoustic or auditory nerve; the portio dura sends off a branch which crosses the tympanum, and is in communication with the gustatory branch of the inferior maxillary nerve, accounting for the pain in the ear sympathising with tooth-ache.

The various branches of the portio dura going to the

\* For an explanation of the branches of the par trigeminum going immediately to the teeth and gums, see "Surgeon Dentist's Manual," page 76.

neck and throat are also well worthy of consideration, being connected with the organs of respiration, and from the expression being influenced by them to a great degree, when the parotid glands and buccal membrane are inflamed.

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### GENERAL OBSERVATIONS.

I have thought it advisable to describe the various blood-vessels entering the parts in contact with the gums, to elucidate more clearly the influence which increased arterial action has over them. This influence is rendered much more important from the numerous ramifications of arteries which enter their substance.

The colour of the gums ought to partake of the same tint which the healthy colour of the blood assumes. When however inflammation prevails, the gums assume tints which are characteristic of this state. If we examine blood when cold, which has been taken from the gums, we find it partaking of the same phenomena as blood from other parts of the frame. Its crassamentum is thick when inflamed, its colour more frequently approaches the colour of venous blood, the serum may be separated easily from the crassamentum, and the appearances as to inflammation are the same as in blood abstracted from any other inflamed part.



The phenomena regarding the heat of the blood, in considering the pathology of the mouth, must also be well deserving of notice ; for, when inflammation is present, febrile symptoms arise, the saliva becomes hot and frothy, and the gums swelling, frequently elongate and put on a disorganising action.

With increased arterial action the venous circulation through the gums is retarded, and, from the stasis of the blood thus produced, debility ensues. The following observations by Sir Charles Bell may elucidate in a great measure this point:—"The French physiologists have departed from the old method of Harvey in explaining the circulation. He wisely took the heart as the centre of the system, and described the vessels going out from it, forming the two circulations, viz. through the body and through the lungs ; but they have assumed the lungs as the centre ; and the veins of the body, and the arteries of the lungs, they call *Système à sang noir*, because it contains the dark-coloured blood and the pulmonic veins ; and the arterial system of the body they call *Système à sang rouge*, because it conveys blood of the bright vermilion colour."

It is this stasis of the blood in the veins, added to the greater variety in their distribution than in that of the arteries, which accounts for the appearances of colour in the gums when under the influence of increased action.

The following observations of the highly-gifted individual we have just quoted will also afford some insight

as to the circulation through the gums. "The most beautiful phenomenon may be seen, by the aid of the microscope, in the circulation of the blood from the arteries to the veins. When the web between the toes of a frog is submitted to the microscope, the eye at first discovers only a confused motion of particles; but, by a steady continuance of the observation, we are soon able to observe the motion of the red particles of the blood. We distinguish the arteries by the rapidity of the particles passing through them in single piles, and, pursuing these particles, they are observed to turn suddenly into larger vessels. These vessels, by the number and slower motion and altered direction of the red globules, are recognised to be the veins."

In the pointed apices of the gums, where they dip between the interstices of the teeth, congested blood remains frequently to some extent. From their peculiar shape such an occurrence might be well anticipated; but, pathologically considering the point, it is one of very high yet unexplained import. The gum around becomes insensible and a morbid exudation then takes place, which is totally incompatible with the proper performance of the functions which nature has assigned to these parts, and which is of high import to the purity of breath.

The remote distribution to other organs, of those nerves which supply the gums has likewise a great influence over their peculiar circulation. The par

vagus running on each side of the œsophagus, and the connections with the great sympathetic and par trigeminum, influence not only the gums, but the teeth in a surprising degree; hence arise nervous pains in the teeth and gums unconnected altogether with decay, or any affection whatever of these organs, and hence also the common error, of extracting teeth indiscriminately, which suffer not from any disease which affects themselves, but from the sympathies with which they are bound to the whole economy.

Nervous excitement is in this instance greatly to be considered, and I need not mention doctrines regarding the influence of the brain over the digestion; these are expounded by other writers.

There is no part of pathology which will afford greater opportunities to researches, both novel and important, than the appearances which present themselves in the gums as influenced by the changes of health. As the pulse indicates febrile, debilitated, and other symptoms, so the appearances which the gums assume show the state of derangement of the digestive organs, &c. This is in a great measure by the mucous membrane of the mouth sympathising with the same membrane in the stomach.

There are also other views of this subject well worthy the consideration of the pathologist. A relaxation of the schneiderian membrane of the nose transmits, in an important degree, an influence to the gums; cynanche

tonsillaris, both chronic and acute, possesses also its own power over them; by the same rule in pulmonary and other complaints the effect of derangement of the mucous membrane of the alimentary canal is soon perceived in the lungs, trachea, &c.

The same order of effects being reversed, irritation set up in the gums produces great constitutional sympathy, and this is sometimes excessive; indigestion, sore throat, cough, relaxation of the schneiderian membrane of the nose, great depression of spirits, increased and heated saliva, fever, and other concomitants.

In the cold winter of 1823, a young woman was admitted into the Hôtel Dieu of Paris, under the following circumstances :—

Suffering from a violent attack of tooth-ache, she went to a pharmacien's for something to relieve it. A man in the shop persuaded her to have it touched with a heated iron; on her going into the cold air, an excessive pain continued in the gum, which began to swell; by the evening the pain was most agonizing, the cheeks were swollen, great fever was set up, and delirium supervened; next morning the effects of the incautious operation were dreadful: the cheeks and head were swollen to an enormous size,—the nose and mouth scarcely perceptible; in the evening, the eyes, which were closed by inflammation, were shut, never again to open.

Serious effects are oftentimes produced by these ill-

judged operations, such as great dejection of spirits, prostration of strength, swelling of the cheeks, fever, and delirium. We might fill volumes in recording the numerous accidents to the constitution from the effects of pivoting teeth. A very eminent dentist and my late father were dining with a distinguished baronet; the former was seated next to a lady who was very affable. He requested her in the course of the evening to call on him, and said he would render her an essential service. He devoted a considerable time to her teeth, and pivoted four upper teeth and the lower canines. On being offered remuneration, he said, "Do you think I have no honour in me?"—So far his intentions were perfect; he had not, however, calculated on the irritability of the constitution he was dealing with; a sudden and dreadful inflammation supervened, attended by its usual depressing concomitants. The severity of the shock to the nervous system produced miscarriage at about the seventh month, and the patient's life was with difficulty saved. The ill effects, however, of the operation, long afterwards remained perceptible; the nervous centre was excited to unusual irritability, and blotches came out in the face. The patient did not survive many years, and it was always imagined that the irritability which the operation excited hastened in a great measure the latter event.

I would prefer throwing a veil over many untoward events which the operation has produced to recording

them in these humble pages. Many have terminated in death.

It is much to be regretted that, when dentists have arrived at a proper knowledge of their profession, they keep the minutiae of such knowledge so much to themselves. This may have arisen from their usually arriving at conclusions by practice, which theoretically they are incapable of accounting for. It is also to be considered that the operations on the teeth are themselves easily arrived at; and hence those who take a limited view of their acquirements and duties may fear their sinking by their own insignificance did they ever become generally known. This is particularly perceptible in those who make false teeth their principal object. I would repudiate to the utmost of my humble power the charlatannerie and narrow-mindedness of many of these savans, and would guard every one against impositions with which this town overflows—we must proceed to other considerations.

It is a matter of the highest importance, when the gums assume tints indicative of an irritable habit of body, that previously to teeth being pivoted, the constitution should be well prepared for the operation; that at the time of performing it, all sensibility in the root should be deadened, and the gum corresponding to the extremity of the root freely lanced. This acts with a double effect: it first produces a discharge of blood, and secondly, forms a counter-irritation.

When inflammation is much to be apprehended, the following prescription ought to be had recourse to.

R. Pil. Hyd. Subm. Comp. gr. iij.

Ext. Col. Comp. gr. vij.

M. Pil. ij. horâ somni sumendâ.

R. Magn. Sulphat. ʒss.

Inf. Senna ʒiiss.

M. To be taken in the morning.

On the following day, continuing spare diet, let a Sedlitz powder be taken, and at night take the following pill :—

R. Pil. Hyd. Subm. Comp. gr. i.

Ext. Col. Comp. gr. iv.

M. Pil. i.

In the morning let a Sedlitz powder be taken, and the operation may then be performed.

The physiology of the gums cannot be understood without an insight into the absorbent system ; for, besides the complication of arteries and veins, their substance is made up of minute glands and lymphatic vessels, the whole of which are connected together by cellular tissue.

“ The capillary vessels are those extreme branches which are as minute as hairs ; but this, though the literal, is not the general meaning of the term. By capillary vessels is rather understood those branches in which the changes are wrought from the blood, and which are either so minute as not to allow the promiscuous flow

of the particles of the blood, or possessed of such a degree of irritability and appetency as only to allow certain parts of that fluid to be transmitted.

"It is proved that in the living body there is no exudation; but no sooner is the animal dead than the fluids exude from the vessels, the secretions pass through the coats of those receptacles which formerly contained them, and one part partakes of the colour of another which is contiguous.

"The lymphatics forming a set of absorbents, we might say that they take up all the fluids which have been thrown out upon the various surfaces of the body. Thus they are found on the pores of the skin, on the surfaces of the cavities and viscera which are covered by the pleura and peritoneum, in the cells of the interstitial and adipose membrane, and in all the ducts and cavities of the body." Absorption is the function assigned to this system of vessels.

It is not our place to enter here into the whole system of absorption. I cannot do better than refer to Sir Charles Bell's work on the Anatomy and Physiology of the Human Body, in the second volume of which it may be found laid down, that the gums with the changes of the body are influenced greatly by the absorbent system. In early life, there may be said to be a continued renovation of parts; and this is peculiarly perceptible in the doctrines of osteology. At middle life, or a little after, the body begins to decrease, the bones get lighter,



their prominent edges become rounded, the edges of the sockets of teeth are blunted by the waste going on, and in the general process the gum itself shrinks to a very considerable extent.

I need scarcely mention the number of mouths which are ruined by a residence in India. Independently of the liability to diseases which require the free use of mercurials, the languor and debility which the climate produces have also a wonderful effect on the gums. Persons who are in the continued habit of inspecting various mouths may form an idea of those which have been ruined by a long residence in an oriental country; this is more particularly perceptible in those patients who suffer from diseased livers. In the appearances which these cases present, there has been a strong action of the absorbent system on the gums; and their sensibility is frequently excited to a considerable degree; arterial action has also been roused, while we perceive a debility and inactivity of the veins, and the gum altogether of a deadened and dark purple colour.

We seldom find dyspepsia unattended by a swollen state of the gums. In this, and in all diseases of the stomach, the mucous membrane of the mouth partakes of the general irritability. That irritability, the effects of which are apparent in the furred state of the tongue, &c., is also apparent in a state of the gum. These sympathies would open a vast field for speculation, but it is merely necessary here to allude to them.

We may also consider the constitution of the healthy and robust; their constitution is mostly untainted by hereditary predispositions; their digestion has through life gone on well; the mucous membrane of the alimentary canal, trachæa, &c., being healthy, that of the mouth is found in the same state.

Let it not, however, be imagined that I include in this all constitutions apparently healthy; beneath a florid complexion is frequently concealed a predisposition to scorbutic humours and apoplexy, and it is a common occurrence to see a mouth in a most unhealthy state belonging to a person with superabundant health. I do not allude so much to the teeth being decayed as I do to a disease to which the gums are liable, and which we shall hereafter consider. There is, however, a very important caries dentium, to which these constitutions are subject, which is too peculiar to remain unnoticed. In a classification of my own, I bring it in under the head of the nigrosa. Its peculiar characteristic is, that whilst disorganization of one part is going on, another part assumes a compensative action, and almost all sensibility is deadened. This is one of the most peculiar features in the diseases of teeth. It is, however, my opinion, that although a peculiar action is going on in the tooth, the constitution has much to do with the absence of pain.

In considering the phenomena displayed between the gums and the constitution, hereditary predispositions

must also be brought before our notice. There is invariably a strong resemblance in the mouth of a child to that which manifests itself in the parents ; in the state of the teeth and appearance of the gum this becomes an essential consideration.

We may well regard all the variations which manifest themselves through life in the gums as very complicated ; they should, however, be well understood. It is of the greatest importance that a free circulation should be kept up through their substance, to prevent the effects of disorganization ; for it is melancholy to see a face which else might boast the greatest beauty, associated with gums of a dark and deadened purple appearance : but the means of promoting a healthy state of the mouth are easy and attainable. It is but necessary, that gums assuming these appearances should be generally distinguished.

If a question were asked as to what most influenced the loss of teeth, it could not be denied that it is the sympathy between the gums and the constitution. If a second question were put as to the immediate influence the gums transmit to the teeth, the answer would be that they send their influence to them in a twofold degree.

1st. The morbid exhalations and exudations from diseased gums decompose the structure of the enamel, and by decaying the teeth exert a primary influence over them.

2ndly, Regarding their loss through looseness, the sympathy between the gums and the constitution is greatly concerned ; for when the former become inflamed the periosteum is also in the same state. There are also many other considerations of great import to the gums. A properly regulated diet adapted to the exigencies of the constitution, and according to the strength and fatigue the system is capable of enduring. We see the gums of a *bon vivant* swollen and unhealthy, and when the system is below par we also see them unhealthy and irritable.

From observations I have made in my intercourse with various classes of society, I would give the former gum to luxurious citizens and the latter to the refined branches of our female aristocracy.

In all diseases of the teeth, whether resulting from constitutional disturbance or from the effects of external applications, the gums are in a certain measure affected. If at the onset, when a decay is incipient in a tooth, there should not appear any degree of irritation in the gums, still the moment the nerve is affected, irritation is known to supervene.

On the teeth themselves diseased gums exert a primary influence throughout all the variations of life ; the child and the adult, the middle-aged and the old person, each possessing these organs in a bad state if the gums be unsound and impure.

## SENSIBILITY.

Sensibility is that faculty of the vital principles which renders us capable of receiving impressions, and which regulates, according to the extent in which we possess it, our feelings and our pain.

In the various secretions necessary to the exigencies of life this faculty is greatly concerned ; and this is not the case with man alone : in animals and in vegetable nature “ it presides over the phenomena of nutrition.”

Sensibility united with contractility is in the earliest stages of our formation directly concerned ; for by them certain involuntary actions are performed which perfect the formation of the bone. The flow of bile, and the muscular motions of the heart, are also influenced by this faculty. It will be well, however, to consider the difference between sensibility and contractility : this will be found explained in physiological writers.

The manner in which various parts of our body imbibe sensations is peculiarly worthy of our consideration ; the eyes are not acted on by sound nor the ears by light, nor do purgative medicines act equally through their course ; each intestine has its separate sensibility attached to it, and each is acted on accordingly.

Richerand makes the following observation on a fact well worthy our consideration :—

“ After teeth have been shed or extracted, the edges of the alveolar processes and the gums become thin from contraction, and the alveolar cavities disappear. These facts appear to me to prove, better than all the experiments performed on living animals (experiments of which, by the bye, the results ought not to be too confidently applied to the phenomena of man), what one should think of the assertions of Haller and his followers on the insensibility and irritability of the serous membranes, and of the organs of a structure analogous to theirs.”

It is by these peculiar laws of nature that we account for the extent and difference of pain connected with the gums and teeth. After mercury has been administered to a considerable extent, we see sensibility roused in the gums and teeth. We also see occasionally the bone of the neck of a tooth so peculiarly sensitive that to touch it produces the greatest agony ; we find the gums also in the same way. All these peculiarities admit of easy explanation, when we understand the laws of sensibility.

I have referred in another part of this work to the inosculation between the chorda tympani and the gustatory twig of the inferior maxillary branch of the par trigeminum. It will be well worth while to bring it again under our notice.

It is this inosculation which accounts for the peculiar sensibility of the teeth when a hard grating noise stimu-

lates the acoustic nerve ; the intensity of this feeling varies in different persons. In very nervous subjects I have known it excite the most distressing sensations, accompanied by an increased flow of saliva. But this is not all ; for even the description in words of the causes producing such grating sensations, such as rubbing coarse cloth on the teeth, &c., is productive of great distress to many persons.

I knew a lady residing at Clapham, who, on flowers being introduced into the room, fell into a state of syncope. This is from the vidian twig of the par trigeminum forming an inosculation with the great sympathetic, which nerve principally influences the heart.

As, however, it is of the highest importance that the doctrine of sensibility be understood, it may be well to enter a little into it. As it is explained by most physiological writers, sensibility is both percipient and latent, and contractility is voluntary and involuntary.

In the first place, sensibility may be considered as flowing from a source which becomes repaired, drained, and exhausted, and which is sometimes concentrated on certain organs.

2ndly. It diminishes with age, and at the period of birth it is said to be very considerable.

3rdly. A liveliness and frequency of impressions wear it out very early, but it recovers its delicacy when the sentient organs have been at rest ; in like manner con-

tractility is exhausted in those muscles which are fatigued, and by repose they recover their energy.

4thly. Sensibility forsaking one organ becomes concentrated in another. Hippocrates tells us that two parts of the body cannot be in great pain at the same time ; tooth-ache is frequently cured by stimulants applied to other parts, also by fear and other nervous impressions. In the same way we may consider the perfection of the senses, for one sense becomes acute when another has lost its energy.

5thly. During sleep, the exercise of the percipient faculty and that of voluntary contractility is entirely suspended.

6thly. Sensibility is more lively and more easily excited in inhabitants of warm climates than in those of the colder regions. Inhabitants of the Northern Pole can have wounds inflicted on the soles of their feet without enduring pain, while the African is thrown into violent convulsions by the most trifling impressions.

7thly. Sensibility is said to be greater with women and children than with men, and the nerves are also larger and softer, speaking proportionately to other parts of the body. The principles of sensibility diminishing with age appear working towards their complete exhaustion, but it is said that at the approach of dissolution an effort is made either to cling to life or to completely exhaust it.

8thly. Nervous women are usually very thin, and



persons of sensibility are seldom overburdened with fat.

It may now be well understood that one person is capable of receiving impressions which another cannot possibly endure ; that when the uterus becomes excited, pain may centre itself in different parts along the course of the nerves, sometimes in the back, in the side, in the gum, or in the tooth ; this latter circumstance is too frequently the case. Nor is it less remarkable that, in delicate females, the nerve of a tooth being irritated, the uterus sympathises to so great an extent that miscarriage is frequently produced.

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## SYMPATHY.

We must now proceed to another faculty, without which our subject would be unexplained. The term sympathy means the relations which the various parts of the body evince towards each other, carrying on a reciprocal intercourse of relations and affections, and a perfect harmony of all actions which take place. When any particular part of the body becomes irritated, it is well known that another, nay, very distant part, may participate in that irritation ; that cases of locked-jaw have been produced by injuries to the tendons of the

extremities; that pressure on the maxillary nerves has produced paralysis of the muscles of the chin, of the arm, and even of the leg. Although beyond doubt this effect has been produced, nevertheless the more immediate causes producing it remain involved in considerable obscurity.

Richerand makes the following observations on sympathy:—"Whytt has clearly shown that the nerves cannot be considered as the exclusive instruments of sympathy, since several muscles of a limb which receive filaments from the same nerve do not sympathise together, while there may be a close and manifest relation between two parts of which the nerves have no immediate connection, since each nervous filament having one of its extremities terminating in the brain, the other, in the part to which it is sent, remains distinct from those of the same trunk, and does not communicate with them.

"It is by means of sympathy that all organs concur in the same end, and yield each other mutual assistance. It affords us the means of explaining how an affection, at first local or limited in its extent, spreads and extends to all the systems. It is thus that every morbid process is carried on."

The affections of the stomach are perhaps more directly concerned with our subject than those of any other part of the human frame. Accompanying the nausea, head-ache, and constitutional derangement, we

have sympathetic pain extending to the gums and even the teeth.

Those sympathies furnish us with an explanation why, when the stomach is out of order, we have rheumatic affections of the jaws with disturbed nights; why tooth-ache is under such circumstances so liable to occur, and is so terrible; why that gum which before was firm and hard becomes extremely sensitive, swells, and suppurates; why the constitutional languor and dejection are so excessive; why palpitations of the heart on motion, syncope and delirium, are also accompanying characteristics produced by swellings of the gum.

While on this head, we may refer to the great sympathetic chain linking the gums through life to the health and temperament; we may go from the restless babe to the decrepit old man; we may see the separate relations that our organs bear to each other in the different periods of life, each sympathising and extending its sympathy all around. In the female constitution the periods of pregnancy produce powerful changes in the gums. Added to the continuity of membranes, which is a powerful source of sympathy, the whole system of the sympathetic nerve forms a chain, whose links vibrate throughout the entire body. We frequently see pain centre itself in a tooth when the uterus is undergoing changes, and the gums assume a swollen condition, sympathising with the physiological state of that

organ. Another consideration must be mentioned before we quit the laws of sympathy. It is a correct knowledge of sympathies which teaches us how to apply counter-irritation to relieve pain fixed in any particular organ ; and to guide us wholesomely as to when we should and when we should not interfere with the operations of nature.

There exist many other points connected with the gums which might lead us to more extended views of those secret links which establish consent in the functions of all our organs.

The present observations will, I hope, determine the necessity of a thorough knowledge of the subject before we can treat the diseases of the mouth.

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### THE INFLUENCE OF THE PASSIONS OF THE MIND ON THE GUMS.

It may be thought singular that I should treat on this subject as connected with the diseases of the gums ; daily experience however tells us that the bodily health and the passions of the mind reciprocally depend on each other.

The passions of the mind have been commonly considered of two kinds in respect to the state of the body, viz. exciting and depressing the vital powers, pro-

ducing analogous effects on the functions to those arising from the operation of stimulant and sedative agents of a material nature. Among the former may be mentioned anger, terror, joy, cheerfulness, hope, desire, love, admiration, and the emotions of refinement. The depressing passions are grief, fear, shame, and anxiety. It is a matter of daily observation that the agency of these exciting and depressing emotions in the animal economy follows the same laws as that of the material stimulants and sedatives. The moderate enjoyment of the former contributes to the free and perfect performance of all the functions, and thereby to the general state of the health ; and debility, with all its train of constitutional effects equally ensues from an immoderate influence of the exciting and from the direct operation of the depressing causes. The operation of the passions and emotions, both as a cause of health and disease, and also as a remedy in many morbid conditions, is illustrated by the observations of many physiologists and pathologists, and by numerous cases which have been recorded by the illustrious Baron Haller.

The exciting passions have been known to produce the following effects on the human frame :—Cheerfulness and moderate joy are found to give vigour to the circulation, to increase the action of the heart and arteries, consequently to support the vital functions connected with it. They render the perspiration easy and free, increase the heat of the body and the per-

spirable fluid, they likewise aid the operations of digestion and secretion in the various organs. This state may therefore be considered favourable to the enjoyment and recovery of health, where the body is languishing under general debility. When, however, the excitement of joy has been excessive and sudden, it has sometimes brought on acute fever, syncope, and, in a few persons, sudden death.

Sophocles, as we are informed by the Vit. Annon., died after being proclaimed victor in a dramatic contest.

By the same rules, laughter tends to good intent when moderate, and abscesses in critical situations have been burst by its effects. Hope, which is the most pleasing state the mind can be in, exerting a beneficial influence on the body, and producing serenity of thought, has often tended to lengthen existence. It may be said to be the passion of the mind which is the last to leave us, continuing to linger till almost the extinction of the vital spark.

The ardency of ambition, especially if attended with a prospect of success, produces similar effects. Its excitement has been so powerful in some instances as even to have cured paralytic affections, and roused the body to exertions far beyond those which it appeared capable of sustaining.

But there's a passion whose tempestuous sway  
Tears up each virtue planted in the heart,  
And shakes to ruin proud philosophy.

Anger rouses the powers of the body and mind, impelling them into action, quickens the pulse, producing redness and heat of the skin. These exertions are often so violent as to exhaust the vigour of the nervous system, as appears by the tremor of the limbs and faltering voice by which they are accompanied. When this passion has been vehement, various diseases have been produced, such as ecchymoses, apoplexies, hæmorrhages, great distension and rupture of the heart, ruptured cicatrices of wounds, local inflammations, profuse perspirations, vomiting, and diarrhœa. The increase of the biliary secretion by this passion is very remarkable, and is mentioned both by ancient and modern authors, inasmuch that with them bile and choler are synonymous with anger. On the other hand, their stimulant effects have under certain circumstances proved beneficial.

Love, which is said to be the strongest of all the passions and the least under the control of our reason, may as well be passed over.

The poets advise—

With caution and reserve

Indulge the sweet destroyer of repose,  
 Nor court too much the queen of charming cares ;  
 For while the cherished poison in your breast  
 Ferments and maddens, rich with jealousy,  
 Abstain distrust, and lessen anxious joy.  
 The wholesome appetites and powers of life  
 Dissolve in languor ; the coy stomach loathes  
 The genial board ; your cheerful days are gone.

The generous bloom that flushed your cheek is fled,  
 To sighs devoted and to pensive pains,  
 Pensive you sit or solitary stray,  
 And waste your youth in musing.

The love of Antiochus for his step-mother Stratonica is said to have been discovered by his pulse.

The depressing or debilitating passions produce an opposite effect; they rob the body of its vigour, diminish and interrupt the secretions, weaken the digestive powers, and if continued wear out the energies of life. Grief enfeebles the body by its sufferings, the circulation is rendered slower, occasioning obstruction of some of the viscera. The digestive organs no longer perform their functions properly; the nervous system is rendered irritable, the temper becomes peevish, and, the mind being occupied with its own ungrateful feelings, the unhappy individual often falls a prey to melancholy and dies of a broken heart.

Indolence and solitude are ever the supporters and nourishers of grief; society and occupations are the remedies for its alleviation. When grief suddenly supervenes, it causes palpitation of the heart, and renders the pulse irregular.

Blindness, gangrene, and sudden death have followed excessive grief, and reports of its changing the colour of the hair are by some persons believed.

Fear is an analogous passion to the preceding; it weakens the whole of the mental faculties and vital



actions. Bashfulness, anxiety, and terror are all different modifications of this passion.

One of the most remarkable passions is nostalgia, or the vehement desire of visiting one's native country; this is similar to grief, and hope is its cure.

It will be now necessary to state my motives for dwelling on the passions of the mind. I knew a lady who was afflicted with great grief and anxiety; the digestive organs became deranged to a very considerable extent, and great nervous excitement was roused in her constitution; pain became suddenly fixed in the gums corresponding to two front teeth; they dropped and became extremely loose. Her age was forty-four.

An English officer detained prisoner of war at Verdun, and who possessed very strong teeth and healthy gums, laboured under all the symptoms of nostalgia. Although permitted to go out, he took his imprisonment so much to heart that he never stirred from his room; pain in a similar manner to the case above named centered itself in the gums; the teeth loosened and were extracted. It was an inordinate action of the vessels of the gums, caused in both instances by the mind and body sympathising, which hastened the loss of these teeth.

Debility is also known as a state very favourable to absorption; this is often produced in the gums and sockets of the teeth by the passions at an early period of life, especially in the female constitution; and it is

no unfrequent occurrence, when the passions of the mind become greatly excited, and extend their prejudicial influence to the digestion and to the health, to see the teeth generally involved in a mass of ruin and corruption. Thus we may also account for appearances which often present themselves in the gums, which bear sometimes great similarity to those produced by the use of mercury. There is this difference, however, which shows itself when this poison has not laid hold of the frame, the numerous anastomosing branches of arteries and veins, and the dilatations and oscillations of absorbents passing through the glandular structure of the gums, are less affected by retarded circulation.

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### THE DISEASES OF THE GUMS.

Diseases of the gums may be considered as produced by proximate and remote constitutional causes.

The proximate causes arise from disease of the organs immediately in contact with the gums. The gums and teeth sympathise with each other. Their healthy condition depends reciprocally upon the healthy state of either. Thus, if the gums become swollen, the inflammation extends to the periosteum, loosens the connection which the teeth have with their sockets, awakens

in them sensibility to the slightest impression, and renders them incapable of performing the function of mastication ; but the mischief does not stop here : the gums become flaccid and spongy, the apices or points between the teeth become congested with blood, and an exudation of a viscid fluid takes place, which, if allowed to remain for any time in contact with the teeth, corrodes the enamel, and they become blackened and unseemly. This effect is particularly observable in the mouths of young females between the ages of eleven and sixteen, at which period, from constitutional change, the circulation is for awhile unsettled. On the other hand, pain in the teeth produces inflammation in the soft parts surrounding them, and, if the vitality of a tooth perish, the adjacent gums refuse the association with dead matter, and the suffering which its presence creates is apparent in the blue or livid condition of the gums, which are exerting themselves slowly to undermine and expel it.

If we were to look for a work which treated, ex professo, on the structure, growth, diseases, &c., of the human hair, we should be much at fault to gratify the object of our enquiry. The gums present a parallel case ; much has been allusively and incidentally said of the diseases of the gums, but we should look in vain for a scientific classification of them : indeed such a classification it must be acknowledged is a work of no small difficulty. Dental surgeons are rarely profound

physiologists; and profound physiologists, occupied for the most part in other investigations, have but little opportunity of becoming acquainted to the same extent as the dental surgeon with the diseases of these organs. It is impossible that a medical practitioner, who practises every branch of his profession, can have such accurate knowledge of one intrinsic part of the science as the person who devotes himself solely to that peculiar branch. Hence the lithotritist, the accoucheur, the aurist, the oculist, and the dentist, have each struck out a distinct walk in the art of surgery. Between dentists and the medical world the gums have been much overlooked, perhaps from neither party wishing to encroach on what did not seem properly to belong to their respective lines of practice.

The most frequent affections of these organs which come under our observation are abscesses, these being generally produced by the teeth. Abscesses are also often situated at the bottom of the sockets of teeth; matter makes way through and destroys the alveolar processes, and at last points through the corresponding part of the gum. This does not affect the general health, but the tooth soon becomes loose. It is very difficult radically to cure these abscesses without extracting the tooth, it being in a great measure the cause producing them, and the bone of the socket being in a diseased state. They become aggravated according to circumstances, and break out on the slightest cold or

derangement of stomach. A sinus is frequently formed, extending along the root of the tooth, and opening between it and the gum. Matter may in this case be pressed out by the finger.

Tumours of the gum occasionally increase in size to a very considerable extent, especially when in the neighbourhood of two or three old stumps which are causing irritation, and they frequently assume a fungoid appearance.

In the same manner abscesses in the gums accompany the exfoliation of a part of the alveolar processes, extending itself to the periosteum, and even sometimes causing exfoliation of the root itself. Abscesses of a more serious nature are frequently produced in the gums from other causes, such as cold striking against the nerve of a decayed tooth, from shocks to the teeth, or from cold penetrating between the gum and the roots of the teeth. This state of things is not unfrequently characterized by severe general symptoms, such as pain first centered in the gum, extending itself to the eye, nose, and ear, head-ache, restlessness, catarrh, cough, occasionally diarrhoea and dysentery, dejection and oppression of spirits, fever, unusual irritability, furred tongue, spasms, fits and convulsions in females, high fever, and delirium.

Fulness of blood and sponginess constitute another form of the diseases of the gums. It is frequently caused by decayed teeth, by extraneous accumulations

of tartar on the teeth, by congenital tendencies, by the mouth being crowded to too great an extent with teeth, by the determination of blood to the gums during the formation and growth of the secondary teeth, and by the unsettled state of the body at that period. These generally are the diseases of the gums which arise from proximate causes.

The diseases we must next consider are of a more complicated nature, and have a more remote origin. They are produced in consequence of hereditary and constitutional predispositions. To a close observer the gums will be found to represent the various modes and fluctuations between health and disease, or in other words we can, by a proper inspection of the gums, detect the existence of disease in the system, the symptoms of which are more usually sought for, though not with greater certainty, at other sources. The morbid principle known under the name of scurvy may for a long time lie dormant in the gums; it may be detected, however, by a brownish appearance of the gum, by a peculiar discoloration on the enamel of the teeth. The countenance may also lead us to ascertain whether or not it exists in the constitution. When scurvy fully pervades the system, its effects are always perceptible in the gums. They shrink back from the teeth, they assume a peculiar dark-brown colour, bleed on the smallest touch, become fetid, and emit from the secreting surface a disorganizing and

carbonized mucus, and the sockets of the teeth are absorbed. The colour and condition of the parts are an indication of the intensity of the affection.

I saw a remarkable case of this kind in a young lady from the country. Her countenance presented all the characteristic appearances of a scorbutic taint; the gums were brown and swollen, emitting a peculiar fœtor; contraction and absorption were going on in the gums, the teeth were loose, their roots all exposed and covered with a brownish mucus, which had exuded from the gums and the parietes of the mouth. This was one of the worst cases I ever saw, considering the youth of the person, and the ravages the disease had committed on the teeth. I ascertained shortly afterwards that this young lady died from the effects of fever.

On the first invasion of this disease, a peculiar turgescence and inactivity of the vessels are perceptible in the gums; they appear to fall into a state of insensibility, from whence it is difficult to rouse them, and the blood seems rather to stagnate in, than circulate through them. In very severe cases of the disease, there exists a purulent discharge from their surfaces, attended by a peculiarly disagreeable odour; the gums assume a most unseemly appearance, their brownish colour has become increased, and they now bleed spontaneously. Not only does matter exude from the gums, but it may be pressed from between the gum and the root of the tooth. This is not the place to enter into

the question whether a tendency to scurvy is always directly hereditary, or whether it is brought on by a particular train of circumstances, oftentimes unavoidable. It is, however, certain that scorbutic tendencies are transmitted from parents to their offspring. Many of the effects of such tendency when manifested in the gums are utterly uncontrollable by art, and they not unfrequently involve the total loss of teeth, and this sometimes at a very early period of life. But here we are speaking of extreme cases; on the other hand, art may enable us not only to mitigate symptoms, but to completely arrest their progress. It is impossible, however, to cope with any malady, unless we fully understand the source from whence it springs, and the physiological construction and sympathies of the part it attacks. From this consideration I entertain hope that once having ascertained the real nature of these causes, and the extent of their effects, the subject will be disentangled from the obscurity which surrounds it, and equally under the control of the dental surgeon as other diseases to which these organs are subject.

Tracing the alteration which takes place in the system from the first point at which a change is observed, we find that in scurvy the digestive function suffers, and all the organs connected with that function become more or less impaired. The elimination of the secretions and the assimilation of the food become less and less perfect, until not only the fluids but the solids



present an atonic character, and show that the powers of life are enfeebled. The alteration in the blood consists in the redundancy of carbon and the deficiency of fibrin. It is consequently of a dark colour, and less coagulable than it should be. Its plastic properties are not only diminished, but sometimes entirely lost, and it exhibits a great tendency to putrescency. There can be little or no reparative, or healthy power, in such a circulating mass. Thus the formative process is impeded, and parts in which the organization is not vigorous are the first to manifest a disposition to give way; wounds will not heal, and newly formed matter is destroyed. This state of things produces those alterations in the gums characterizing the appearance of scurvy; but there exist other points marking out the hold which the disease takes of these parts.

The capillaries are in the same diminished state of vitality as the rest of the solids. Their coats are morbidly attenuated; they have lost their tenacity, consequently their propulsive power. The increase of their diameter necessarily induces an influx of more blood to them than is consistent with the health of the gum; and, as from their debilitated state they cannot get rid of it, a stasis of that fluid takes place, constituting itself a powerful local aggravation of the original constitutional derangement; for the detention of the blood (admitting even that it were healthy) would, by reason of its assuming a venous character, destroy the

tone of the part in which it was involved. Having noticed some of the effects of scurvy on the gums, let us now place in contrast with them those of scrofula on the same parts. The appearances which scrofula produces on the gums did not escape the observation of John Hunter:—it is much to be regretted that he gives the subject such brief mention; he speaks of them in these words:—"But, as this seems to be the principal way in which the gums are affected, I suspect that the same symptoms may arise from different causes, as I have often seen the same appearances in children evidently of a scrofulous habit, and have also suspected them in grown people." The indication, however, which the gums furnish of scrofula lurking in the system differs materially from that denoting the existence of scurvy, for their colour approaches more to a greenish blue; they appear flaccid and irritable; hang looser than other gums round the necks of the teeth; grow as it were luxuriantly in the interstices between them, and there is a general languor and debility of the vessels.

In drawing a comparison between the effects of scurvy and scrofula in the gums, we must notice the following very highly important facts. Scurvy is principally caused by an undue action of those vessels which build up and renovate the system; while, on the other hand, scrofula is caused by a morbid condition of those vessels destined to eliminate the excrementitious

part of the body, or in other words to remove matter which may be left behind while the circulation is performing its offices and running its usual course. Matter also is taken up which ought to give place to a healthy deposit; it attacks the glandular parts, and diseasing them transmits its baneful influence to the whole system: so follows consumption and other diseases.

Arrived at this part of my subject, great complication must exist in giving a specific character in each disease to the appearances of the gums; for the first physiologists of the day look on scrofula, cancer, fungous hæmatodes, and schirrhous, as so closely allied to the same diathesis of constitution that it is very difficult to define the peculiarities, and give to the circulatory system in each disease its specific tendency. I shall therefore leave scrofula and scurvy by themselves, and go to the appearances which the gums present in inflammatory cases.

Besides the symptoms which common or healthy inflammation produces in the gums, and which yield to the general treatment of inflammation, we have also the effects of other constitutional peculiarities perceptible in the appearances of these organs. In inflammatory fevers, with the furred tongue, parched mouth, and thirst, we have a swollen and vascular appearance in the condition of the gum accompanying other symptoms of fever. In cases of intermittent fever, with the languor and general constitutional debility, we have

the same languor of the gum, with the usual appearances of increased vascularity and retarded venous circulation. A celebrated German writer on intermittent fever considers that during the intensity of the symptoms of this disease the gum swells, and continues in that state as long as the febrile condition remains. He states that during this period a tonic regimen ought to be persisted in. It is evident that, by the same rule as the gum first falls into a state of apathy, it is also long in recovering its usual tone and circulation, and before such is the case a complete restoration to health must take place. Under these circumstances, when fever has once been allayed, the gums may be restored quickly to a healthy state; but we must now consider those constitutions subject to general irritation, in which inflammation brings on sometimes cancerous and fungoid diseases, and the appearances which in such cases the gums present it is impossible to eradicate from them.

Numerous opportunities are open to every one of examining the cancer patients at the various hospitals of this metropolis. In most of these cases an experienced eye will detect a peculiarity of countenance and constitution. Although cancer and scirrhus may be produced by local injuries, yet it is generally acknowledged that an undue action depending on some remote cause may be roused in the constitution, and that scirrhus may come on at certain periods of life,

aggravated by circumstances connected with constitutional tendencies. Sir Astley Cooper, in his lectures on this point, says, "The formation of scirrhus matter is not confined to the breast, but it is the index of a disordered constitution." It is from this circumstance that gums assume those alterations which I consider to have the character of disease. In cancer, as in scirrhus affections and fungous hæmatodes, there are strong indications of disease in the gums, differing according to the extent the constitutional symptoms may have run. At the commencement the gum appears red, irritable, and vascular; granulations, with an increased action around them, are occasionally interspersed over their surfaces; high up under the lip the veins are unusually swollen, their apices between the teeth are all overcharged with congested blood, and underneath the mucous membrane covering them their substance is of a fluid more than of a solid tendency.

In persons somewhat advanced in years most of the teeth are gone, while those remaining are loose and much better away. In young persons reduced by hæmorrhages from these diseases, the effects on the gums are in accordance with what we might anticipate. The blanched cancerous countenance, the pale but irritable-looking gum, and the pale conjunctiva of the eye as in consumptive cases, are invariably the companions of each other. There is this essential difference between the diagnosis of cancer and scrofula, which may not prove

unworthy of notice : cancer attacks those glands destined for formative functions in the animal economy, while scrofula centres itself in those glands destined for the offices, as we have before observed, connected immediately with the absorbents and capillaries. While on this head, we may mention tumours and diseases of the antrum highmorianum, as produced by a peculiar diathesis of constitution, also cases of lupus and *noli me tangere*. The following case was furnished me by my brother ; it occurred while he was house-surgeon at the Middlesex hospital:—A small spot first appeared on the nose of a female aged forty-seven, and increased, baffling all medical skill ; the eyes, lips, and gums were attacked in a most horrible manner ; the gums sloughed, with the sockets of most of the teeth ; there was also a dreadful slough of the nose, and of the integuments of the eyes ; they presented a most ghastly appearance ; vision was almost gone, the septum nasi and nose all eaten away, and, through the orifice remaining, one could distinctly look down the throat. The lips were quite destroyed, and the chin and gums were even with each other. Three teeth only were left, and these added to the horrors of the face. In this state the progress of the disease was arrested.

Connected also with the constitution are other changes which the gums frequently assume ; they are subject to callous thickenings, and these sometimes grow to a very considerable size both on the outer and

inner edges of the gums; they seldom however cause inconvenience, and are rarely found but in the mouths of persons of strong constitutions. It must be clear that the different conditions of the gums in diseases produced by certain diatheses of body form alone a set of diseases of the highest importance to the pathologist and to the dental surgeon. The transmission of venereal virus from the parent to the offspring may also be brought in with a sympathising condition of the gum. In secondary symptoms, when exfoliations of the jaws are frequent, there is always disease of the gums and great looseness of the teeth; but, nature having separated the diseased from the healthy portion of the bone, a reparative process commences, and the gums heal over the new bone that is formed.

There are also other important alterations to which the gums are subject; these may form another separate class of diseases. Under this head I would arrange those changes produced by debility, by the use of mercurials, by climate, by indigestion, by sedentary habits, by the passions of the mind, &c.

The causes producing debility in the gums are various; but whenever a debilitated state of the system ensues, no matter from what source or disease, the effects of such debility are soon transmitted to them; hence in early life the septa-dentium become absorbed, and a recession of the gum which then takes place shows the state of atrophy and debility which has existed.

This condition of the gum may be brought on by the effects of fever, by the use of mercurials, by affections of the nervous system, by bad living, by parturition, by hæmorrhages, and by chronic disease. When the system has been subjected to waste or absorption, the sockets of the teeth and gums frequently recede for a considerable time; but if a period arrives when the body recovers from this state, and assumes a stronger tendency, the absorbent process discontinues its rapid course. Agreeably, however, to the destinies of nature, after the fortieth year, decay of constitution proceeds in the same order as growth did up to that period; we then take our course to the grave with diseases more frequently producing debility; there is a gradual waste of parts, the fluids become more disposed to putrescency, and in the general process of life the gums, with their teeth and the sockets, exhibit phenomena of vast interest and importance. All this might even form another separate class of diseases in the gums.

The diseased appearances induced by the passage of mercury through the capillary vessels of the gums deserve also much attention. It is curious to see the influence which only a small portion of this mineral sends to these organs. It first produces an alteration with somewhat a bluish appearance, but this in some constitutions is much more marked than in others; if



its use be continued for any length of time, the gums become swollen, their extremities are congested with blood, and they then take a very decided blue appearance. This, however, differs in the diatheses of different constitutions. I look on those gums which evince signs of latent constitutional irritation as more easily affected by the use of mercury than the gums of those persons free from such conditions. Where indeed decided signs of constitutional irritation exist, the exhibition of mercury will rouse up disease in the gums, and not unfrequently involve the whole of the teeth in a loosened state, from which in these constitutions they seldom or never recover. I look on the gums of persons of a pure diathesis of constitution as affected by mercury but with the greatest difficulty, and when under its influence these organs assume a very blue appearance.

On the contrary, those gums in other constitutions not so fortunate are acted on in different ways, according to the tendencies they evince to disease. Hence, when mercury has been given to persons of a scorbutic taint, it appears to rouse in the gums the worst tendencies they imbibe from a disposition to scurvy. In like manner in persons of a scrofulous habit, the use of mercury ought not to be resorted to without due consideration; the sudden effects it produces on the gums are caused by their incapability of bearing the subtile

action of this mineral, for the capillaries and absorbents throughout the system are already in a state of atony and disease.

A change of residence to a damp climate will often rouse up in the gums a great degree of vascularity. In the damp places of England and Ireland, the appearances which the gums present are of a turgid and vascular nature. In the damp countries of France these conditions of the gums run a much greater length from the circumstance of the difference in the constitutions of the two nations. In the damp parts of Germany and Switzerland persons also lose their teeth early in life, the climate engenders malaria and low fever, enfeebles the powers of digestion, and brings on rheumatic affections with languor and general constitutional debility.

A morbid vascularity of the gums is oftentimes produced by cerebral affections, by close scholastic application, by a state of fear and anxiety in which youths are kept, added to the manner in which they are often made to pore over books by parents who themselves are untaught in the real doctrines of nature.

We have already enlarged on the sympathy between the stomach and the gums, an altered appearance of the one coinciding with the same phenomena which may be distinctly traced to the other ; hence dissipation and vice in young persons produce derangement of the stomach, transmitting its characteristics to the gum.

The young female, emerging from the nursery to the nocturnal scenes of London revelry, is also subjected to disease of these organs, the gums as well as the stomach sympathizing with the state of excitement she is then kept in. Here we may also bring in the man of literature and close application; the tradesman, exposed to hot rooms, and capable of enjoying but little air and exercise; the statesman, borne down by the trammels of office, with its anxieties and perplexities; the unhappy hypochondriac; and, lastly, the maniac himself.

The period of pregnancy often produces a diseased alteration in the gums, which occasionally loosens and destroys the teeth; this comes on from the unsettled state of the circulation during that important period.

Thus far I have endeavoured to explain some leading facts connected with the diseased appearances of the gums. There remains still another important pathological sympathy which must not be passed over. I allude to a morbid state of sensibility in which they are frequently found; this state is roused in the gums to a considerable extent by the effects of scarlet and other fevers when severe, by the after effects of mercury when given in an oriental country, as also by all circumstances which tend to disease the general state of the nervous system.

I lately witnessed a remarkable case:—A young gentleman had just returned from India, where he had

taken mercury to a very considerable extent. He had fallen into a regular state of hypochondriasis ; he had sensations every now and then over him of momentary dissolution occurring, and of these he evinced the greatest horror ; he dreaded the appearance of a razor, of a knife, or of any instrument which could inflict a wound ; his gums had receded from the teeth ; their edges were thickened, but of a firm consistency ; these were very painful to the touch, as also were the necks of all the teeth where the bony part was exposed. I used my utmost endeavours to persuade him that he would soon be well, and under medical guidance he went into the country. In cases of *tic doloureux*, especially in elderly females, the gums frequently possess extreme sensibility. I recollect a lady who was dreadfully afflicted with *tic doloureux*. Her gums were soft, and it appeared as if most of the capillary vessels in them had sloughed, and that a lymph of a light brown pellucid colour, coinciding with the state she was in, was underneath their surfaces.

Sensibility is also often roused in the gums to a great extent by heat of stomach and cold : it also succeeds the vascular condition, roused by the many circumstances we have considered, which bring on an inordinate circulation through them.

## SYNOPSIS OF THE DISEASES AND MORBID ALTERATIONS OF THE GUMS.

Diseases produced by proximate causes.

Infantine and puerile diseases of the gums.

Abscesses, tumours, swellings, inflammations, morbid affections.

Diseases produced by remote constitutional causes are, First, those from the effects of scurvy or from scrofula. Secondly, from constitutional irritation, when neither scurvy nor scrofula has developed itself. Thirdly, from fevers, from indigestion, from catarrh, from inflammations. Fourthly, from mercurials. Fifthly, from constitutional debility, however induced, including nervous excitement and the passions of the mind.

1st. Diseases produced by scurvy are,

A turgescence of the gums, with a brownish appearance of their structure.

An inordinate detention of highly carbonized blood in their vessels, and occasional hæmorrhage.

Diminished vitality of the capillary vessels.

Suppuration, with purulent discharge from the mucous surfaces of the gums.

2ndly. Diseased appearances produced by scrofula.

An alteration of the glandular structure of the gum, with disease of the capillary vessels.

Detention of blood in the apices of the gums.

Morbid exudations from the surfaces.

An atonic state of their general circulation.

These diseased appearances being devoid of the brown colour perceptible in scurvy.

3rdly. Diseased alterations from constitutional irritation, when neither scrofula nor scurvy has developed itself, are

General heat, irritation, and redness, fungous excrescences, and hardened ridges.

4thly. Diseased alterations from mercurials produce Increased glandular action and vascularity. Foulness, languor. A slough of the capillary vessels.

Morbid sensibility. Hæmorrhage.

5thly. Constitutional debility, however induced, including the various passions of the mind.

Atrophy and atony of the gum.

Absorption of the socket and recession of the gum.

Languor, and the same morbid sensibility as results from the use of mercurials.

## REMARKS ON THE DISEASES OF THE GUMS.

It may be asked, What phenomena do the diseases of the gums open to our view ?

The diseases of the gums, caused by proximate causes, elucidate many abstruse points in pathology; they show the laws of nature, connecting the wholesome state of the teeth to that of the gums; they open to our view many essential considerations between the principles of living and dead parts, and teach us that, in the production of disease, there is always an irritating cause, exciting the changes which come on; for of this there exists no circumstance more clearly illustrating the point than the fact of obstinate abscesses in the cheek, which will yield to no medicinal aid, being cured by the extraction of an unsound tooth, which, although remotely situated, was the principal cause of the irritation. These circumstances, although of great import and merit, sink into insignificance when we consider the vast field of research the diseases of the gums produced by the more remote causes open to us.

It is a well known and an established fact that although we may consider ourselves well in health, and in the enjoyment of all our faculties with their blessings, still there exists in every one a diathesis of a peculiar nature; each varied disposition has its different tendencies; in one we have a disposition to one condition, which may be connected with the venous and arterial system; and, in another constitution, we have that connected with a diseased state of the nervous, glandular, and absorbent system.

There is not recognized by pathologists any invari-

able indication of each diathesis ; nor are we oftentimes at all aware of it, until we see the development of disease fully set up in the constitution.

If the tongue, which is a fleshy body, covered merely by a reflection of the mucous membrane of the mouth with corrugations and rugæ, give us a correct view into the state of the health, how much more may we look forward to in the state and condition of the gum ? We have not here a dense mass of muscles, but we have one of the most delicate net-works of arteries, veins, and absorbents, that we can meet with in the whole construction of the body. We have nerves of sense with small glandular bodies, and opening mouths of capillary vessels divested of thick skin, which renders their exact nature imperceptible to us, while the gum is covered merely by a thin expansion of the mucous membrane of the mouth. We may not then wonder why deviations in the general mass of circulation alter the appearance of these parts, or why, in fact, the circulating mass, changed into an impure state, produces also a diseased alteration of the gum.

In inferring, therefore, *à priori*, that if the nature of the gums be properly known and scrutinized, it will manifest greater changes, indicative of the alterations in the body's condition, than any other part of the frame, I trust that I am borne out by true physiological facts. Amongst other important considerations, I must allude to the correctness with which, if we have a real



practical knowledge of the gum, we may judge of the extent of irritation lying dormant in the constitution. I must state, from observations which I have made with considerable care for the last thirteen years, that there is no person in whose constitution disease is lurking who has his gums in a wholesome and pure state; and that previously to the development of disease, let it show itself how it will, the gum becomes so perceptibly involved in the changes as to afford premonitory forebodings of illness. In the diseased alterations from scurvy, scrofula, and other diseases, this theory is directly applicable; as also in changes of high importance to the health which occur at middle age.

By the physician, I hope to see these facts appreciated according to the importance they actually possess. To the surgeon, the gums may prove a guide as to the derangement of system he may expect his operations to set up; they may direct him as to previous treatment and prepare him for after consequences arising, which are oftentimes both mysterious and uncontrollable.

The theories regarding the alterations which take place in the breath remain involved in very considerable mystery. The changes which it is subjected to from alterations in the habit of body never occur without an altered appearance in the condition of the gum; and this is an actual fact, which, to elucidate any theory on the point, is of more avail than volumes of the finest

composition. It must be admitted that no one can form so correct an estimate of the condition of the breath, as connected with that of the constitution, as the surgeon, who, laying aside all other professional occupations, is compelled to be in close contact with the mouth and teeth.

It has always been observed that a mercurial breath has its peculiar taint, and that those suffering from scurvy have the same peculiarity; but the variations of breath appear to me so diversified that each may be easily detected by any person subjected as I have been to be in close contact with various mouths. The fœtor arising from false teeth, and that from decayed teeth, can each be easily distinguished.

By a wholesome and pure gum it may be known that let mercury be given even to a great extent, let the most noisome drugs and eatables be continually swallowed, let, lastly, high fever arise, the breath will be affected but with difficulty, and on the discontinuance of medicines will retain all its pristine sweetness, going down through life pure as the constitution of the person whose lot may be the happiness of possessing it.

On the contrary there is an irritable appearance of the gums which indicates an impurity of breath; for a short time indeed it may prove wholesome, but, should any thing occur to cause the least excitement, it assumes an unpleasant fœtor, and this is occasionally quite insupportable.

From all these circumstances it may be clearly seen that the gums open to us an extended view of many tendencies which the constitution evinces to disease, and also that there is no other part of the frame whose outward appearances will unfold to us the real character of each diathesis of body with equal certainty.

However unconnected the pathologist may have considered the appearances of the gums with disease in general, and more particularly with derangement of the digestion, the day will most probably arrive when they will not only direct him in the treatment of disease, but give him such insight into the tendencies to it as to guide him greatly in both averting and subduing its effects. Hitherto there has existed no certain means of detecting the existence of disease till its regular symptoms have been fully set up and developed; but the phenomena of diseased alteration in the structure of these organs may tend one day to throw the most important light on this interesting subject.

## PART II.

### ON THE GUMS IN THEIR EARLY STATE.

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In noticing the varied appearances of the gums in the different ages of life in which I continually see them, I have observed many other phenomena besides those mentioned, which may form novel and important theories, but I must renew the observations I have already made, that the gums have been underrated, if not neglected, by our pathologists. It was a matter of much surprise to me that this point did not strike the attention of a very highly-gifted physician who has given out some recent theories on dentition. To those theories, however, I must give my humble but most ardent praise, congratulating society in general on the fact of their elucidating many points which, before his work was published, were somewhat unexplained.

I have given his observations some unusual consideration, for I had previously notes of cases corrob-

rating many which are mentioned. Convulsions, however, occasioned by cutting the last wisdom tooth, are not very common. I have heard of very few cases decidedly occurring within the last three months; one was communicated to me by my highly-talented friend Mr. Costello. In according great constitutional disturbance to pressure on the dental twigs of the maxillary nerves, we follow the natural laws of doctrines of pressure on nerves. The considerations of anormal development of the teeth, which are introduced to the medical profession, are worthy of merited praise.

I wish it, however, to be clearly understood that, without underrating in the smallest degree the phenomena occasionally accompanying pressure on these nerves, I attribute causes producing constitutional effects more immediately, and more frequently, to the irritability of the gum during the important changes which take place when the process of teething is going on. I would not, however, wish my observations to end with the completion of the teeth; I would extend them from the earliest periods of life to the prolonged days of our existence.

As at the very onset of our life many arguments have existed, whether the capsule investing the pulp or whether the gum itself was the seat of constitutional disturbance during teething, I wish to give each of these organs some pathological consideration, as regards the state they are in at that important period of our life.

That each organ has its separate destinies allotted to it is a matter not involved in the slightest doubt.

The capsule is a delicate membrane, situated over the rudiments of each future tooth lying under the gum, and attached at its extremities to the bone, from which I have frequently detached it. It is divisible into two laminæ, which may be separated from each other. I have always considered it, at that period, as the periosteum to the bone, with an internal coat studded with the minute mouths of secreting ducts to deposit the liquor inspissens of Morgagni hardening afterwards to the enamel. It is therefore the matrix to that portion of the tooth. The future state of the enamel is directly under its influence. To effect its own destinies it is furnished with blood-vessels to some extent: these obey the phenomena of secretion, which is always influenced in its nature, by the powers of the constitution, to exert its functions in a proper and wholesome way.

I look upon all causes tending to the vitiation of secretions generally, at an early period of life, as tending to the detriment of the enamel. I would more especially call my reader's attention to the inordinate action of all important organs when an adjacent part is in a state of inflammation; hence arise spasmodic cramps, vomiting, and other severe symptoms of adjacent organs. If this then, as regards the offices of the capsule, may be thought somewhat novel, I hope to give it also some degree of interest. When during teething the gums are

labouring under great irritation, sore and tender to the slightest touch, the constitution, sympathizing also to a great extent, is borne down by the depressing influence of diarrhæa, spasms, cramps, fevers, and convulsions. Mark, then, the curious phenomena perceptible in the deposition of the liquor inspissens. The powers which the capsule possessed to deposit this fluid become suspended, and the bone of the tooth progressing in growth on the pulp becomes frequently developed, when the deposition of the enamel is retarded. At this early time of life the secondary teeth are gradually growing; arrived at the period when they are destined to come forth, the effects of infantine disease are perceptible in them. The part of the enamel to be formed about the period of illness is wanting, while the other part which developed itself afterwards has its natural covering.

In the same way, any sudden shock to the constitution exerts the same influence on the depositing surface of the capsule. It was thought necessary to wean an infant at the age of three months, but he grew up remarkably strong and healthy. I kept sight of him as a case subservient to this theory. All his family had particularly healthy teeth; but at the period when the primary teeth were gone the secondary ones came forward devoid of enamel. Numerous cases, bearing a similar analogy, come continually under notice, these frequently extending themselves through a whole family. Such are the purposes for which nature destined the

capsule. The following are the observations of sir C. Bell, whom I consider to have a greater knowledge of the growth of teeth than any other physiologist with whom I have conversed : "The enamel is formed after the body of the teeth has advanced towards its perfect form. It is formed by a secretion from the capsule or membrane which invests the teeth, and which is originally continuous with the lower part of the pulp. The enamel is thicker at the point and on the body of the tooth than at its neck. Mr. Hunter supposed that the capsule always secreting, and the upper part of the tooth being formed first, it would follow of course that the point and body of the tooth would be covered with a thicker deposition ; but it rather appears that that part of the sac opposite to the upper part and body of the tooth has a greater power of secreting, being in truth more vascular and spongy ; for the whole body of the bony part of the tooth is formed before the enamel invests the tooth. We are indebted to Herissant for much of the explanation of the manner in which the enamel is formed. He describes the sac, its attachment to the pulp and to the neck of the teeth. As the tooth changes to its natural form the sac also changes ; at first it is delicate and thin, but it thickens apace, and he asserts that if after this process is begun you examine the inner surface with a glass, you will perceive it to be composed of little vesicles in regular order, and which sometimes have a limpid fluid contained in them :



this liquid, exuded from the surface of the tooth, he supposes to be the enamel. He explains how this sac, originally investing the body and neck of the tooth, being pierced by the edge of the tooth, and the tooth rising through it is inverted ; and, by still keeping its connection with the circle of the crown of the tooth, rises up in connection with the gum, and in some degree forms the new gum surrounding the tooth."

We must now consider the gum at this period of life : its appearance is not as cartilaginous as at a later period of life ; it constitutes, in fact, a membranous covering to the jaw. Added to the continuity of membranes which we have already considered as a very powerful source of sympathy, we must bear in mind that the gums possess sensitiveness as other parts, and this is acute when roused into action. In whatever light the physiologist may see them, they equally deserve his attention. Let him view them as they exist in the early periods of dentition ; then the speechless babe is easily brought into debility by trifling circumstances ; add to this debility the continued irritation kept up by the excessive tenderness of the gum, and the nervous communication with these organs : the sympathetic affections may be clearly comprehended as arising from the gum, and the excessive dejection and prostration of strength accompanying inflammation which may be centered in them afford other proofs of this fact.

The following case occurred to a young gentleman

who was cutting a wisdom tooth. Pain was centered at the back of the mouth, with stiffness of the jaw, headache, and very unusual constitutional disturbance; the gum over the part was so tender that the slightest touch was agonizing. The tooth presented itself to the gum in a slanting direction, so that its anterior points alone caused the mischief. On the gum being freely lanced, a portion of the tooth protruded, and, the position of the tooth being changed, the posterior portions began to come forward. The respite was therefore of short duration; the same symptoms supervened, with the same exquisite tenderness of the gum. This case may be considered as particularly referrible to our subject, from the positive absence of the capsule, from the constitutional disturbance accompanying the progress of the tooth throughout the case, and from the great pain produced by touching the surface of the gum. I look on the pain seated in the capsule as trifling compared to that centered in the gum. The growth of the tooth below is gradual; arrived at the gum, it exerts, as it were, an attempt to pass rapidly through it. All these circumstances induce me to be somewhat doubtful as to the constitutional disturbance during dentition being in any way influenced by the capsule.

Long before the period of birth the gums performed an office deserving our peculiar notice. In the construction of the different capsules, both of the primary and secondary sets of teeth, these organs contributed to pre-

serve their arched arrangement: the position they assume is guided by an attachment of each capsule to the gum, the primary set by a small fold to it, and the secondary set by a direct suspension. The changes of position which the teeth at this period take, to accommodate themselves regularly to their destined situation, is well worthy of scientific researches.

Other circumstances connected also with conformation and disease take their origin at this early period of life. That the shape of the jaws, the appearance of the gums, the size of the teeth, with their decays and diseases, are influenced by congenital pre-dispositions, is a matter which I have long settled in my own mind. We find in some families a peculiarly-shaped jaw, in others a deficiency of teeth, sometimes the milky teeth large, and remaining till a late period of life in the gum; at other times, the secondary teeth small and large, but always bearing a strong analogy to those of one of the parents. We find decay of teeth running through whole families; we find, where constitutions of parents differ, some of the children taking the maternal tendencies and others the paternal. In my humble opinion, the order of the sexes is in these cases often reversed, the girls taking after their father, the boys after their mother. I do not give these rules as certain, but in this order I have most frequently perceived them.

The jaws, and the membranous expansion covering them which forms the gum, increase in development

with each other. Hitherto no teeth have existed in the infant's mouth: these would have irritated the tender nipple from which sustenance was to be drawn. The primary teeth below the gum, having acquired their proper shape, evince a determination to assume their destined position in the mouth. At this period of life an epoch may be said to commence full of danger to the infant. It has been computed by statistical writers that half the number of children die during the first few years of their existence. Professor Camper informs us that, out of 5989 infants admitted into the foundling hospitals in Paris in one year, no less than 4095 died during the first month, 673 in the remaining eleven months, and at the expiration of five years only 884 were found alive. The mortality, however, in London is very far below this computation.

The fatality of teething may be computed in very difficult cases at about one in six or seven; this process, however, is calculated to rouse up many diseases which else might have remained quiescent. Dentition, when difficult, is preceded by various symptoms; heat in the gums, thirst, fever, restlessness, an inclination to insert the finger in the mouth, and an increased action of the salivary glands. I leave considerations going deeper into the subject to the writings of medical men.

I was favoured by my friend Mr. Rice, of the Royal Metropolitan Infirmary for Diseases of Children, with an unparalleled opportunity of permission to examine

20,899 physicians' cases which have come under his immediate notice. I subjoin an average of the diseases which occurred in each hundred cases, drawing them from different seasons and years in which they occurred.

Affections of the head	3	Gastritis (inflammation of the stomach)	1
Affections of the bowels	3	Herpes (itch)	10
Affections of the lungs	1	Hydrocephalus	1
Catarrh post rubeola	1	Icterus (jaundice)	1
Cephalitis (inflammation of the brain)	8	Marasmus (wasting)	1
Cholera	2	Mesenteritis chronica	1
Cynanche (sore throat)	1	Meningitis (inflammation of the meninges of the brain)	2
Croup	1	Pulmonitis	2
Dentitio	5	Pneumonæa	8
Dyspepsia	3	Pertussis (hooping cough)	3
Febris	1	Phthisis incipiens	2
Febris catarrhalis	2	Paralysma abdominalis	1
Febris bilio remittens	1	Swelled face	3
Febris gastrica	1	Scrofula	8
Febris dentitionalis	6	Tinia capitis	10
Febris cum eruptione	2	Ulcers and abscess	2
Febris verminosa	1		
Febris mesenterica	2		

I would give it as my humble opinion, and this may receive strength from Mr. Rice's high authority, that more than two-thirds of physicians' cases which occur between the fifth and thirtieth month of an infant's life are connected more or less with dentition. In the

registers of this dispensary it does not appear that children are generally brought with actual convulsions, the name of the diseases with which they are actually suffering being specified on the day of admission. It is however known, that most of those diseases more immediately the effects of dentition, in the above abstract, are attended more generally with convulsions. Affections of the head, of the bowels, of the lungs, with sore throat, dyspepsia, dysentery, and fever, may be attributed generally to the constitutional disturbance which the state of the gum at this period of life produces.

We have also chronic eruptive diseases; and according to the tendency which the constitution has to scurvy or scrofula so the irritation of teething tends to the more early development of these diseases.

*100 Surgeons' Cases.*

Abscesses of the ear . . . . . 2	Rachitis . . . . . 2
Exomphalos . . . . . 1	Swelled face . . . . . 2
Enlarged tonsils . . . . . 1	Sora and scabies . . . . . 11
Erysipelas . . . . . 2	Scrofula . . . . . 6
Eruptio infantilis . . . . . 2	Tinia capitis . . . . . 14
Dentition . . . . . 9	Tumours . . . . . 2
Leucorrhæa . . . . . 2	Tumours in the axilla . . . . . 2
Herpes . . . . . 13	Ulcers . . . . . 2
Ophthalmia . . . . . 7	Psoas abscesses . . . . . 2
Purulent ophthalmia . . . . . 1	Wounded head . . . . . 2
Phymosis . . . . . 1	Ulcerated cornea . . . . . 1
Porygo . . . . . 9	Accidents . . . . . 4

These I have averaged from 5907 surgical cases, which occurred also under the scientific care of Mr. Rice at the Broad Street Infirmary for Diseases of Children.

It will be seen that the surgical cases brought on from the effects of teething are not so numerous as those which come under the care of the physician. Many are congenital, and others oftentimes the results of accidents; the great constitutional sympathy which the gum when irritated produces, is frequently witnessed by the surgeon in various ways; it often produces effects which baffle all the skill and science he can bestow on it. He sees latent scrofula roused up, and abscesses arise, leaving marks which go down through life to the grave. This is oftentimes accompanied by other symptoms, more especially in the female constitution, most strikingly illustrative of all the laws of sympathy. The mortality which occurred among the patients at this institution has become greatly diminished from the great attention which is paid to the symptoms which teething produces on the nervous system, and by the use in many instances, where danger exists, of cooling and frigerative applications to the head.

The teeth continue to pierce the gums for nearly two years after their first appearance, the train of circumstances connected with this process being regulated by the constitution and health of the child. The gums ought now to remain in a quiescent state for about



three years and a half; this calculation I conceive to be tolerably correct. Unpleasant circumstances frequently interrupt this respite; the primary teeth are often found in a state of decay, abscesses are produced in the gums, and a continual state of irritability is kept up in the mouth.

In this instance I would advise practitioners and parents to adopt great firmness and decision. This is rendered doubly essential from the easy manner in which debility is produced at this early period of life. The tooth-ache is accompanied by fever and restlessness, with loss of sleep, abscesses, and swellings of the gum. The submaxillary and parotid glands frequently enlarge, and many constitutional tendencies come forward. All these circumstances render the extraction of the primary teeth when decayed and irritable as most essentially requisite.

I hope to be thought neither unfeeling nor presuming, but I cannot conclude these remarks without strongly urging their propriety. I will defy any child to gain proper health who is continually worn down by pain in the jaw; it must impair the energy of the constitution, and frequently be a focus to kindle symptoms which may be long regretted as unextinguishable.

We must now view the infant as having passed the most critical periods of his life, capable of walking erect, and beginning to exercise the powers of speech; to the perfection of this faculty the regular shape of the



jaws and teeth is most essentially requisite. In considering the process that has been going on, there are many points well worthy of notice to the physiologist, the theologist, and to those seeking for general information. It is well worth consideration how the growth of teeth from the gums is adapted to the shape of the jaws, and how they progress in growth with the exigencies which nature requires to support the strength of the constitution. In the first instance, when sustenance is to be drawn from the nipple, the gums are tender and extremely delicate; as they increase in strength the nipple gets gradually harder—teeth also come forward, showing that an alteration in constitution is taking place which requires a change of diet; the teeth are at first only calculated to bite a soft and delicate substance, preparing it for suction. Afterwards come teeth for tearing the more solid morsel; then we have others for bruising it; this being in unison with the strength the child has gained, and with the changes of nutriment the constitution demands to support the growth which it continues to acquire.

When five years and a half of a child's life have been completed, other changes take place in the gum; their vascularity is perceptibly increasing; swellings appear corresponding to the roots of the teeth, and if we touch the two lower incisors they are found to be loose in the gum. All this is to usher in a period when another process of the animal œconomy commences of the

greatest import to the health and beauty of the child. It was necessary early in life, when the jaws and gums were small and delicate, that those organs which nature furnished for mastication should be also of a corresponding construction ; now, however, the case is very different. During the interval of rest which the gums have had, they have increased in growth along with the jaw beneath them ; the teeth are evidently too small for the mouth ; they begin to stand separate, and a change is required to keep pace with the strength the child is daily acquiring. We may pause to consider the consequences had these teeth been given us in the first instance ; their immense size would have produced irritation in the mouth beyond what the child was capable of enduring ; the incisor teeth would most probably have presented themselves sideways or in a slanting direction ; there would have been no room for the immense molar teeth, and in the chaotic mass the canine teeth would have either projected into the nose, or perhaps touched the orbit of the eye : these effects nature has happily averted. It is ordained that when the primary teeth should be no longer subservient to the exigencies required, a secondary permanent set of teeth should come forward from the gums in gradation with the strength the jaws have acquired, and subservient to the purposes of mastication ; for the child now requires solid food to keep him in full vigour and growth.

The period when this process commences differs in most children; it may however, with great correctness, be computed to take place from the period the child is five years and a half old, to when he arrives at the seventh year; this however is very late, but I have seen instances of teeth being cut at this period.

The first indication of a change taking place is behind the last primary teeth; there is then a direct pressure forwards. This I consider to be an impulse to the growth of the secondary teeth; for they now begin to loosen the primary set, whose bodies have long since been formed and hid in the jaws.

I conceive that absorption of the roots of the primary teeth only commences when the secondary set begin to grow, and the following is the manner in which I consider the process begins:—

When the development of the jaws progresses, the primary set of teeth become involuntarily pressed into a different position, and the growth is alone concentrated in the future set beneath them. The first large molar tooth begins to push forwards, and the whole pressure falls directly on the front of the mouth, the centre of which may be considered as the point of an angle. There is an apparent increase in the vascularity of the gum; numerous absorbent vessels which exist in it and those going from it are set in action, and this is extended to the periosteum of the root. It is not my place to enter here into a discussion as to the

existence of circulation in the bony part of these teeth ; but I give it as my opinion that the roots of all teeth possess a degree of life which may be easily roused into action. Many absurdities have been stated as to the manner in which absorption of the roots of these teeth takes place, and these have been given out by writers of acknowledged reputation.

Shedding the teeth is a process accompanied in general with little or no danger. I have seen a few cases in which similar symptoms presented themselves to those which accompany early dentition. I attribute these circumstances more to the tardy development of the first permanent molar tooth than to the circumstance of any irritation which shedding the teeth is likely to produce. In the last case which I witnessed, the central incisors in the upper jaw were making their way through the gum nearly at the same time as the under teeth were falling out; these were coming out behind the primary teeth, which were in their usual position; there was considerable tumefaction of the adjacent part, and the gums generally were tender and irritable. This case was accompanied by fever, irritation, restlessness, increased flow of saliva, starting in sleep, and other symptoms which usually accompany difficult dentition.

I subjoin the following tables of the order in which both sets of teeth grow, and I conceive them to be as

correct as the normal and anormal considerations will admit of. Any table of my own would be of no avail.

*Sir Richard Croft's table of the eruption of the first dentition.*

Molars.		Canines.	Incisors.				Canines.	Molars.	
9	5	7	3	2	2	3	7	5	9
10	6	8	4	1	1	4	8	6	10

*Dr. Ashburner's table of the eruption of the second dentition.*

Periods.	Teeth.
Six years.	{ First four permanent molares appear.
Seven years to eight years.	{ Two central incisors of the lower jaw fall out, and are replaced by two permanent central incisors. Two central incisors of the upper jaw fall out, and are succeeded by the large permanent incisors.
Eight years to nine years.	{ Shedding of the lower lateral, then of the upper lateral incisors, and their replacement by permanent teeth.



Periods.	Teeth.
Nine years to ten years.	Shedding of the first deciduous molar teeth of the lower jaw, their replacement by the first bicuspid, then of the first deciduous molar teeth of the upper jaw, and their replacement by the first bicuspid teeth.
Nine years and a half to twelve years.	Shedding of the posterior molares of the lower jaw, or of the canine teeth, and their replacement; then those of the upper jaw, the molares being replaced by bicuspid teeth.
Twelve years to thirteen years and a half.	Cutting of the four second permanent molares.
Seventeen years to twenty-one years.	Cutting of the four third permanent molares or wise teeth.

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It will be observed that nature ordains our being furnished with teeth for mastication at the same time that a provision is made for the front of the mouth. The canine tooth is generally the last to come forward. The position which this tooth takes depends principally on the normal growth of the jaw. At this period

of life, especially in the female constitution, the growth of the jaws is often retarded, while development of another organ is going on, preparing it for offices it is hereafter destined to perform. We have, in this instance, a sympathetic tardiness of growth in the jaws, which is but little known to the dentists of this metropolis. It is no uncommon occurrence to find teeth extracted to make room for an eye-tooth which may appear coming out from the gum in an irregular position. At this period nature may be directing the powers of the constitution to the proper formation of the uterus, and then all growth in the jaws is frequently retarded. Dr. Ashburner is the only person who has hitherto satisfactorily explained that the growth of the jaws and the uterus depend reciprocally on each other, but here we have a most powerful insight into this fact: a tooth may have been extracted; nature, having perfected the formation of the uterus, directs its attention to the jaws; they increase in growth, the gums expand along with them, and the teeth get much less crowded; that correct arrangement which nature herself would have managed is now disturbed by the ignorance of the dentist: the teeth are found to stand separated from each other; the consolidation of their architectural strength is disturbed; they are less capable of resistance to mastication than they would have been, and stand much less firm in the gum through life than nature originally intended. It cannot, however, be denied, that the ex-

traction of a tooth from a crowded jaw, if resorted to at a proper period, is often the means of preserving many teeth which would otherwise have been ruined by decays. Before the permanent canine tooth is itself visible, its shape may be ascertained by a rise in the gum which indicates its future position; if the corner of the mouth be raised, this may be distinctly seen; here we have a guide as to the future arrangement of the teeth which the dentist should always refer to. Before, however, he can decide as to the extraction of a small bicuspid tooth, should the mouth be crowded, he must bear in mind the retarded growth which we have just considered, the concentration of the powers of the constitution to complete other formations, and the circumstance of the gums and jaws being subject to an increase of their capacity when other processes have assumed a healthy growth.

We have rather digressed into circumstances connected more with the teeth than with the gums: we left them at a period when the process of shedding the teeth had commenced; this period, at a fair calculation, may be averaged at about six years before its completion. We must now consider the state these organs are in during this period.

At about the sixth year the vascular action of the gums increases; the determination of blood to them being part of the process which is going on, the primary teeth become loose, they are subjected to motions



whenever any resistance is offered them ; and this also increases the vascularity of the gums. The gums do not take part in the formation of the new set, but their absorbent vessels are decidedly active in the removal of the roots of the primary set ; and they exert themselves gradually to expel the sequestra which the remaining portions of these teeth now become. The gums gradually accommodate themselves to the shape of the secondary teeth as soon as the primary ones are shed. While the body of the tooth is passing through the gum there can be no possible adhesion ; the substance of the enamel renders this quite impossible : the case differs very widely when the neck of the tooth comes in contact with the gum ; the periosteum covering the root is firmly attached to it at its neck, and it is there, if we examine the parts, that the gum has a very firm attachment also to it. The manner in which this attachment takes place may be found worthy of future researches.

We now see the gums attaching themselves to a new set of teeth, and performing for them the same offices as they before did to the set that has been shed. A great change has taken place in their appearance ; they formerly surrounded the necks of the primary teeth, which were small and delicate ; they now cover teeth with large roots projecting upwards and backwards in the jaws ; the gum takes the shape of the root around which it extends, and there is a great increase of vascu-

larity produced by the tension that existed while the secondary teeth forced their way forwards.

At this early period of life, we frequently see ill effects arising from the condition of the gums and mouth sympathising with that of the stomach and the general health. It is no unfrequent occurrence to find the first permanent grinder decayed as soon as it has appeared above the gum ; this is more particularly observable in children of a very fair complexion who may have overgrown their strength.

We also frequently, about this age, observe spiculæ of the roots of the primary teeth remaining in the gum and keeping up a continued state of irritation. It is of the highest importance to the healthy state of the gum that these spiculæ should be removed ; and this can always be effected with little inconvenience at this period of life.

It is often found that there exudes from gums, when languor of circulation exists in them, an exudation which produces a brown stain on the enamel of the front teeth : this appearance is wholly peculiar to an early period of life. If a healthier condition of the gum come on, that part of the tooth which grows down from it will assume also a more cleanly appearance.

During this period nature has been occupied in perfecting the various parts of the frame by a continued and general renovation, preparing each part for the duties it has hereafter to perform ; with the genera

growth therefore of the body, the jaws, the gums, and the teeth also have increased. We still trace this growth adapting itself to the powers and exigencies of the constitution; and the gradual manner in which the whole has been conducted may be considered a grand feature in the mechanism of our frame.

Between the thirteenth and fourteenth year we find that twenty-eight teeth are formed in the mouth. There remains, however, a wisdom tooth on each side to come forward: the growth of the jaws is still very far from being completed. We frequently find, where their development has been retarded, and where the teeth are large, that they are far too crowded for their size. The condition of the gum now indicates considerable derangement; the face is subject to flushes, head-aches come on, nervousness, and a general atonic state of the whole system. Here is often disease established, the true cause of which is not known. I must award to Dr. Ashburner much praise for recommending to the notice of the medical world considerations which must tend to elucidate this important point.

I know several cases of actual paralysis being cured by the extraction of a tooth. One of the most remarkable occurred to the daughter of a nobleman, residing in Arlington Street. Paralysis of the leg had come on after symptoms indicative of nervous derangement had shown themselves. The jaw was formed anomalously, and the teeth were crowded to a very considerable

extent. Mr. Dumergue suggested that the paralysis was caused by the crowded state of the jaw, and recommended the extraction of a tooth. The result of this operation was singular; for the use of the leg was restored. This case is well worthy of notice from its showing that, if nervous irritation be once conveyed to the sensorium, there is no knowing where the effects of the irritation may fall.

A case came under my immediate eye, through the kindness of my friend Mr. Hunt, of Lower Brook Street. Here was paralysis of the muscles at the back of the neck relieved by extraction of a tooth.

Similar cases to these are well known on the continent. I had them mentioned to me as frequently occurring by the celebrated M. Pernet, of Paris.

These cases all admit of a physiological explanation in the following manner:—Lesion of a branch of the maxillary nerve, if not of the nerve itself, takes place, the consequent irritation is transmitted upwards to the sensorium, and a change of parts is so established in that organ that paralysis of some part of the body ensues.

We find cases analogous to these often occurring in dentition; and, although not attended with paralysis, they are involved in the same theories. Irritation is sent up by the fifth pair of nerves to the pons varolii; a turgescence of the neighbouring vessels takes place, and this in its turn becomes a source of



injury. The eighth pair of nerves, arising from the medulla oblongata, behind the pons varolii, becomes soon involved in the same turgescence, and then those parts to which the eighth pair of nerves sends branches partake of the general irritation; hence symptoms similar to those of croup are often known, when in fact nothing exists but irritation, consequent on dentition, being established by means of the laryngeal nerve; and hence also may arise many other symptoms, producing many disagreeable circumstances. I saw also a case in the winter which deserves considerable attention. The wisdom tooth was so impacted in the back of the jaw as to press against the maxillary nerve, just before its entering the canal; the consequence of the lesion was, as we might expect, loss of sensation of those muscles which are supplied by this nerve as it emerges from the foramen mentale. The case serves to substantiate the splendid discoveries made by our great physiologist, Sir Charles Bell, on the nervous system; for here, although sensation was gone, motion still existed. On the extraction of the irritating tooth, the parts supplied by this nerve recovered their usual sensation. I would draw a very essential difference between the symptoms which pressure on nerves produces and those which accompany an inflamed state of the gum. In the one we have cases of paralysis, and in the other we have convulsions.

While awarding to nature the full extent of all her

beauties, we must not forget that preternatural growths of various parts of the frame are often seen, and that these occasionally may be benefited by surgical skill. It would appear that these circumstances depend on a peculiar diathesis of constitution; for we find them hereditary, and rarely existing in the mouth but with diseased alteration in the structure of the gums; and it is no less remarkable that decays of teeth are mostly concomitant with these alterations. I do not, however, pretend to assert, that where teeth are crowded they must for a certainty decay: this would be an actual error. I have known instances, where many of the primary teeth have not been shed, where the mouth was so crowded as to constitute what is commonly called a double row, and yet these teeth have gone on without decaying till a very lengthened period of life. This I attribute to the health and temperament generally; for it is well worthy of remark, that most of these instances occurred to persons of very strong constitutions. We must here consider that the jaws may frequently be crowded from various causes; the teeth may come forward very large, while, as far as relates to the normal growth of the jaw, there is nothing found to complain of. All these instances differ very materially from cases attended by anormal growth; for here we invariably find diseased alteration in the structure of the gum. As, however, numerous cases exist where looseness of teeth comes on without any decay

being present, and as in these cases it is necessary to preserve the support which one tooth derives from another, the grand criterion then to be our guide as to the extraction of teeth to give room in the mouth must be the shape of the jaws, and at the same time the condition of the gum.

If we watch narrowly the phenomena of diseased alteration in any part of the frame, it is seldom that we are at a loss to detect its origin. It is a very common remark that the side teeth are the first to decay, and I have often heard much doubt expressed as to the reason why this so frequently occurs. I consider it firstly influenced by the great pressure of the canine tooth at the period of its irruption; indeed, if we examine these teeth when such pressure occurs, we find the striated texture of their sides altered from its original appearance by the force of pressure which has existed, and, as the gum at this period is here subject to detention of blood, so the exudation which takes place from it lodges on the weakened part, while the process of decomposition is assisted by the pressure which is still going on. This I consider the reason why the side teeth are so frequently the first to decay. But we come to another consideration which is of much higher importance: I allude to decays which frequently commence at this early period of life, and blacken and destroy the front teeth.

I can readily join in the deepest feelings of regret

which all parents must experience at the occurrence of this melancholy circumstance. This is often in addition rendered more unfortunate from the circumstance of the decay being undiscovered, even when it has made rapid progress in the teeth. It is well worthy of remark, that subjected to this peculiar decay we frequently see females of the most extraordinary beauty. The large dark eye and brow, with fair hair, added to a skin of delicacy betraying every blue vein beneath it, may at this age be looked on with suspicion. By the same rule, the teeth of the tall and very fair young female of fifteen, who may have outgrown her strength, are also subject to the same occurrence. Minute observation, strengthened by a due regard to physiology, places it beyond doubt that all persons subject to that peculiar diathesis of constitution, where there exist laxity of fibre and delicacy of structure, are more especially subjected to this caries of the front teeth. But although some of the most beautiful persons I have seen, I may safely say, of this age, have been afflicted by this distressing occurrence, I wish to make it understood that, when debilitating symptoms are seen, it is reckless of beauty and of form. It does not follow but that, accompanying extraordinary beauty, we have a full and perfect mouth of teeth. I could here instance two ladies of very high rank; for I have the honour of occasionally looking at their mouth; their teeth and gums deserve equal merit with their beauty, and this has long



been a theme of conversation. I have also observed that in most cases where puberty is attained either too early or too late, or where the constitution has more duties to perform than its strength is adequate to, where organic disease and exciting causes exist, we have too often the distressing occurrence of these decays. In selecting from the male constitution those afflicted in a similar manner, we find the same circumstances are conducive to it, but of course we must draw a distinction between the difference of the two habits of body.

If I take to myself any credit for a general success in operations on the front teeth, I wish it to be clearly understood that this success depends principally on the attention which in these instances I always pay to the health and condition of the gum. I have satisfactorily discovered that the gum, influenced by disease, is the principal agent in producing these decays; but, previously to entering into any explanation on the point, we must consider some facts connected with the decay itself.

Much complication has existed as to whether decays of teeth commence externally or internally. Daily experience, however, shows that all substances or fluids coming in contact with the enamel, which have in their component parts any of the different acids, possess, according to the greater portion of the acid they contain, an adequate power of decomposing the texture of

the enamel. Decays almost always commence by the enamel losing its striated texture, and this is frequently first produced by the sides of the front teeth being subjected to attrition, by the pressure which in cases of crowded teeth invariably falls on them.

At this early period of life the bone of the front teeth has not acquired its proper solidity; their internal cavities and the pulpy substances contained in them being large, the whole tooth soon becomes involved in a mass of corruption. Here, then, we have the principal cause why teeth which decay early in life so soon blacken; for the increase of the bone in thickness is not at all calculated to keep pace with the decomposition which is going on. This process of decomposition once commenced acts on itself in a two-fold ratio; since it also becomes a contaminating cause to the rest of the teeth, even if the causes which first created the mischief have ceased to exist.

It is impossible often to witness mouths disfigured by black and decayed front teeth without considering the serious attention which the importance of the subject merits. It must be allowed that in many instances the contact of various solids and fluids with the teeth bring on in them a state of decomposition and decay, but I attribute these circumstances more to the manner in which their component parts were originally formed than to any thing else; for it is a circumstance well worthy of notice, though dangerous to experiments

repeated too often, that where at the period of teething the health has been good, and where circumstances during the time of growth have tended to give the enamel its compactibility and hardness, it is capable of resistance to all food and drink which we commonly make use of. In later years than the epoch of life the peculiarities of which are now to be considered, great difference can be distinguished between decays caused by constitutional effects, and those produced by the contact of deleterious particles in the food with them; for in these instances we see teeth corroding while their adjacent gum is in a healthy state: I therefore look on these decays as somewhat slow in their progress, while those we meet with occurring between the twelfth and fifteenth year are of a different character, and each of these is peculiar to different diatheses of constitution. Never having seen the decays I am now treating of but in teeth whose necks were surrounded by gums in a condition almost bordering on a state of decomposition, I must necessarily consider the decay as influenced in a great degree by the mucus exuded from the unhealthy gum. I am strengthened in these conclusions from conversations which I have had with some of the eminent experimental chemists of the day. It is taught by chemical professors, that decomposition cannot go on in the living subject; but we have the decided existence of life in the bone of a tooth. This, however,

prevails only in a low degree, and when detention of blood takes place in the apices of the gums, between the teeth, it becomes carbonized; and then I consider the exudation covering them as partaking of disorganization.

As great difficulty exists in collecting a sufficient quantity of the mucus which we find exuded from the gums and collected on them when the muscles of the lip and the tongue are in a quiescent state, I cannot be expected to give its precise analysis; I can only state those products which arise from decomposition of animal matter. Putrefaction of dead animal matter comes on by its exposure to air, moisture, and a moderate temperature, and during the process its original texture disappears, and products of an offensive nature are generated. The products arising from the decomposition are water, ammonia, carbonic acid, and sulphuretted, phosphuretted, and carburetted hydrogen gases. It would appear that this effect produced on the teeth is by the sulphuretted hydrogen. This might receive confirmation from the same fœtor attending the mucus exuded from these parts and lodging between the teeth, as is frequently found in the breath; and as the fœtor, thus arising, is sulphuretted hydrogen. From experiments, however, which I have made, I attribute the decay to the presence of carbonic acid.

To keep the teeth in a healthy condition while their structure is yet in its early days, it is necessary to attend minutely to the condition of the gums, to empty their vessels when turgid and swollen, to pro-

note a general tone and healthy circulation through them, and to resort to those remedies which their debilitated or heated state each separately requires ; but, while the dental surgeon exerts his skill to check the diseased alterations presenting themselves, he must not omit calling in assistance from the physician, who, by duly regulating the constitution, can provide remedies best calculated to prevent general disease of the teeth.

We come to another process which produces many serious effects in the mouth, and which influences also all parts sympathising with the gums : I allude to the irruption of the wisdom tooth. Much has already been published on the irruption of this tooth, but the views which have been generally taken on the subject have, till lately, been very limited. Science, however, having made rapid strides in every department, we might have expected that those persons whose occupations were devoted to the teeth and mouth would have given out some doctrines explanatory of the constitutional disturbance which so frequently occurs with the appearance of this tooth. The subject has lately increased in interest. I have heard it stated that a much higher colouring had been given to many cases which Dr. Ashburner relates than they actually merited. As, however, convulsions and other effects on the constitution have been removed by free incisions into the gum, at the part where this tooth by its pressure is causing irritation, this alone may form a fact which may open to our eyes other effects likely to be produced on the

nervous system. That this system is liable to changes excited in the first instance by this tooth is a point respecting which there exists no doubt. From this derangement there comes on too many conditions of health, the true origin of which is often unsuspected; and if I place foremost among these, diseases of the brain, lungs, and stomach, I need only refer to the anatomy of the base of the brain, and this fact will be clearly established.

Dr. Ashburner quotes the following passage from Alp. Toirac, Docteur en Medicine, published in 1828: "M. Esquirol, à qui j'ai communiqué cette observation, m'a rapporté qu'une dame atteinte de folie avait été amenée à sa maison de santé, et qu'il l'avait rendue à la raison en favorisant par une incision cruciale la sortie d'une dent de sagesse." I can readily conceive that when there exists in the diathesis of a constitution a predisposition to diseases of the mind a difficult irruption of this tooth is alone capable of producing the most serious effects.

I lately saw a case of a young West-Indian lady which deserves considerable attention. Her age was sixteen; three large wisdom teeth had come forward, and had produced frequent convulsions; she still suffered from the fourth, which was beneath the gum. I made a longitudinal incision over the centre of the tooth from its posterior to its anterior part; on either side of this I made a circular figure, defined by the ex-

tremes of the longitudinal incision; the gum over the tooth was then separated into two portions.

I have since received intelligence that this tooth is giving very little trouble. I cannot too strongly recommend this operation to the notice of the medical world in all cases where the irruption of the wisdom tooth is attended with constitutional disturbance. It may with safety be performed when the tooth shows its first signs of appearance; the surface of the gum is then flat, condronous, and somewhat insensible. It is shortly after this period that the worst constitutional effects are produced; for just as the tooth is through the gum the inconvenience is concentrated more in the spot itself; there are tenderness and increased vascularity around it: convulsions have by this time generally ceased.

Amongst other severe systems which we often witness at this period, we must not forget tetanus, neuralgic symptoms, and in females leucorrhœa is no unfrequent occurrence. If I do not penetrate more deeply into the subject, and contemplate cases of hydrocephalus and of other diseases terminating frequently in death, which cases have occurred from difficult and impeded dentition, it is solely because the subject concerns the medical practitioner, and is not in the province of that part of surgery which alone I profess. That, however, these occur, I can bear ample testimony, from the results of post mortem examinations.

The case which was brought before the Westminster

Medical Society last winter was as follows :—The under-jaw of a gentleman aged thirty-nine was short ; his teeth were very large, so much so, that there was no room in the mouth for the tooth which is denominated the second molaris. He was subject to continued swellings of his face, which always burst internally. In these swellings there was a peculiar feature : sometimes they appeared corresponding to the parotid gland, and sometimes near the submaxillary glands a sinus was formed, connecting one abscess to another. There was pressure of the maxillary nerve, for loss of sensation was established corresponding to the chin. As no wisdom tooth existed in the mouth, it was thought probable that one was hid in the parts, and that the swellings which came on were the effects of the efforts which nature was making to extricate it from its curious position. In probing the abscesses, the tooth was felt about an inch behind the flap extending from the upper to the lower jaw. I first made a free incision, connecting the two abscesses together, and imagined that they would not again occur ; the pus which came away was very considerable, and the swelling for a time went down. This, however, soon re-appeared, to my great annoyance. I proposed the extraction of the tooth ; for the immense mass of matter which had long pressed on the bone would soon have caused an extensive exfoliation. The operation was considered highly dangerous, but was decided on. Mr. Hunt, of Lower



Brook Street, who first sent the patient to me, was present at the time, and assisted in the operation. He made an incision in the flap, to render the tooth more easily got at. As, however, it lay imbedded a great depth in the soft parts, its real position could not be detected, and the incision was not sufficiently large to admit of the forceps passing down. I forced a strong straight instrument underneath the tooth, and with all my strength disengaged it from its socket. This was not effected without great laceration. As, however, the aperture was not yet large enough to admit of the forceps, much difficulty existed as to the means of removing the tooth from the soft parts it was forced into, and at this period I was advised to desist from further attempts. In examining the tooth with a strong and curved instrument, I thought I had a firm hold at the posterior part; and, taking advantage of the moment, forced it through the aperture which was made. The hæmorrhage was, throughout the operation, considerable, but not alarming.

Here is a case illustrative of several points worthy of peculiar notice. It is no unimportant feature in the case that the root of the tooth was very curved, and its points particularly sharp. Let it, in addition, be remarked that all teeth in the construction of which I have observed the foregoing anomaly, and which I have ventured to call *loxostreptic*, and *acmated* (ἀ λοξος, obliquus, et στρεφω, verto; ακμη, punctum) teeth, more frequently

produce serious effects than those of a normal construction. We must not omit observing that this tooth, before its appearance, frequently produces a heated state of the gums : at this period we often find the breath tainted, the head hot, the countenance blanched, accompanied by general languor and debility. The pathologist ought to bear in mind that this general illness may terminate in the most fatal results ; and that no effect is ever produced without a cause. In the female constitution it too frequently occurs, even when no pain exists corresponding with the wisdom tooth, that derangement of health is produced by lesion of some dental twig, and this is established by changes in the position of the wisdom tooth ; these changes of position more frequently occur when the wisdom tooth is pushing forwards to take its position in the mouth if development of the jaw is anormal.

At about the nineteenth or twentieth year terminate, in my opinion, the peculiarities of the primary age. More extended and enlightened views might be taken of the general effect which the difficult irruption of teeth, and the anormal development of the jaws, produce on the nervous system. I am fully persuaded, that at some period, and that not far distant, the mazy labyrinth of puerile diseases, and all the arcana of what humanity\* suffers during the early periods of life, will

\* Quod si mihi quidquam humaniter eveniret.—*Cicero Epist. ad Fam.*

be much more clearly revealed to the medical world when the important features which dentition presents from its earliest to its latest stages are fully investigated.

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### ON THE SECONDARY AGE OF THE GUMS.

We terminated the primary age with the period when the formation and development of the teeth are usually completed. It may however happen that the wisdom tooth does not appear till a very late period of life. To the primary age, which is synonymous with youth, succeeds another age corresponding with manhood. Then all increase of the body in height is at an end; and all the organs acquire hardness, solidity, and consistency. Fauchard says, "*Les dents s'embellissent jusqu'au l'age de vingt ans;*" but I have observed that the age of nineteen is generally the period of their highest beauty.

The gums and teeth may, at this period, be considered as the plants and trees in the summer season, arrayed in their garb of beauty, and arrived at the highest point of strength and vigour; the constitution has emerged from the debilitating operation of growth, and the powers of the frame are concentrated in it, to preserve the bulk it has at length attained.

Amongst other changes perceptible in the frame which the evolution of nineteen or twenty years has produced, we see in the gums a relationship and pathological affinity to other parts of the body which have been formed. Those gums which about the tenth year presented diseased alterations, and were turgid and swollen, coinciding with the unsettled state of the constitution, have now with improved health assumed a healthier state. But, as we have before explained that each diathesis of body takes its own peculiarities, so this is the period when each gum also has taken its own characterising features. We might take advantage of this period to enter again into the exact differences in different gums ; but, perhaps, enough has already been said. We must not, however, neglect to observe the hard cartilaginous gum accompanying the healthy habit of body, and indicating absence of latent disease ; and that wherever this appears, we have an exact equipoise in the lymphatic and the energy of the sanguineous system.

It is not at this period of life that the gums are subject to any peculiar diseases, save those conceived in the previous age, and handed down to this succeeding one. As to those effects produced by the follies and intemperances of youth, the original purposes of the gums are not to be found fault with. When the action of mercurials has been resorted to in order to eradicate disease contracted in youth, when the moral government was weak, and had fallen under the empire of

appetite, we have recession of the gum and of the sockets of the teeth—we find schism of the one from the other, and the roots of the teeth left exposed by the natural covering of the gum. The bone thus exposed is extremely sensitive, for it is devoid of the protection which nature planted around it. This constitutes the most peculiar feature of disease which we witness in the gums at about the twenty-first year ; but, although it is produced in its severest forms by the action of mercurials, we see modifications of it as we pass on in life from other causes. It is often met with in the gums of females of a delicate and nervous temperament, and may be attributed to causes connected with the sanguiferous system, in which an undue excess of action has fallen into an acquired habit ; and an early waste of constitution has been induced by debilitating causes. We see it also produced by the state of debility which follows acute and intermittent fevers ; and that which continued fever also induces. In many instances where it occurs it may be considered as somewhat unaccountable, especially if we do not thoroughly understand the processes of absorption, nutrition, the secretions, sensation, and the whole functions of assimilation.

But while I seek in the intricate labyrinths of the animal œconomy for illustrations from the remotest sources, I must not forget that this diseased appearance is produced by other causes, which although

ostensibly simple, are nevertheless entitled to our serious attention. Accumulations of tartar frequently lodge on the necks of the teeth, and become in time firmly impacted under the gum; this, increasing by constant accession of matter, separates the gum from the root; and, being hard, swells out the gum, and produces a recession of it from the tooth.

Amongst other qualifications which the present enlightened age considers essential in the person of the female of a superior sphere of life, of the well-bred and thoroughly gentlemanly character, and the man accustomed to move in genteel society, the attribute of cleanliness holds, perhaps, the highest consideration, and this not unworthily, for it is of real benefit to the maintenance of health. To the mouth itself it is of the highest importance, whether we consider our own comfort or the nicer feelings of those around us. I must particularly mention that the various particles of food which after meals might lodge between the teeth should be washed away, that at night they should be well brushed to ensure this object, and that in the morning the same process should be resorted to in order to remove the mucus which, during the hours of repose, has exuded from the gums and collected on the teeth. Where ordinary means fail in the attainment of this desirable object, a good rough powder may be used. I recommend hard friction to the gums and teeth early in life; it serves to keep the one in a

healthy, the other in a cleanly state. In later years, when the teeth stand loose, and when the bone of the tooth is exposed, the case becomes necessarily different. Sponginess of the gums, which is often at this age produced by accumulations of tartar round the teeth, may be prevented by these salutary means.

Passing on in this age, and considering many phenomena which occur, especially in the female constitution, connected with the various temperaments and idiosyncrasies, where the passions of the mind are strong, and where their influence prevails over the habits of the body, we are not at a loss to conceive why the gums from a healthy condition frequently fall in a few years into a state of atony and languor; why then the teeth, participating as they do in the general idiosyncrasies, fall also by the indomitable impetus producing diseases of the gum; why, by vitiated secretions, by heat of the stomach and breath, their bony part becomes decomposed; and why, losing their affinity for lime, they become, as it were, a soft and yielding substance. With an undue excess of the exciting passions, with disease of the liver, and hypochondriasis, we have often general disease of the gums and teeth, and the condition in which I have often seen them influenced by these diseases deserves the most serious attention; the teeth mouldering by decay, and falling into crumbling atoms, their necks exposed, and exquisitely tender to the touch; the gums greenish, the

openings of the capillaries appearing obliterated, and their whole structure altogether diseased. If it happen that most of the teeth have broken away, then, in the place of them, we have diseased gum; it elongates over the root, bleeds by the contact of food, keeps up great heat of the mouth, and involves, even at this early age, the fifth pair of nerves in general irritability. We occasionally meet with abscesses, ulcers, tumours, and morbid growths in the gums at this period of life, but they are not natural to the gum; they all depend on accidents, on teeth deprived of life, on diseased bone, or constitutional irritability.

If we look to the gums at the thirtieth year, we see in them those changes which the wear and tear of the constitution might naturally induce us to expect. Ten years passed in London differ from the same period passed in rustic enjoyments; to the close applications of life, its fatigues, its sedentary moments dragged on without the enjoyment of fine air to purify the constitution, the country gentleman is an entire stranger. The peacefulness of a retired village, and the busy bustling scenes of London, produce on the nervous system opposite tendencies; and so also in the mouth we see a decided difference produced. In the resident of London we find heat of the mouth, increase of saliva, continued fever, and frequency of decay in the teeth; and in the mouth of the countryman, where the constitution is sound, we only see disease in the form of acci-



dents, or caused by inconsistencies of living, love of table enjoyments, or other sensual delights.

It is during the past ten years that many habits have been acquired which must prejudice or benefit the future state of the constitution; and, as its powers have been cherished or diminished, so we see the gums more or less affected by debility.

Repeated child-bearing and miscarriages often produce this effect, which, however, may be traced back to the change of general circulation taking place previously to such occurrences: we then often see an inordinate circulation roused in the gums, and the foundation laid for disease, which at about the forty-fifth year subjects the teeth to looseness. It is of the highest importance that at this period of life this effect produced should be especially considered, and that all inflammatory symptoms which show themselves should be reduced by topical bleeding.

By the thirty-fifth year we find, where decided tendencies to disease of the gums at the commencement of this age existed, that these tendencies have mostly increased. It is exceedingly difficult to define the peculiarities of the gums at this age; for it is rarely that we find them in two persons bearing an exact similarity to each other. In some persons, premature old age has come on, while in others the strength of youth is still in all its vigour. We must, however, take into consideration all the vicissitudes of life. Many gums may about

the middle of this age have evinced dispositions to disease from the constitution having been subjected to development of such disease ; but in the ensuing period, the causes tending to the development of such tendencies being removed, the gums have, with the constitution, had time to become settled and healthy.

It is about this age that accidents which occurred some years back to the teeth become seriously annoying. If any of the teeth have received blows early in life, they now often become loose and troublesome. If their vitality has been destroyed, they become black and unseemly, and the gums all around them fall into a state of irritability. In those habits of body where excess of arterial action exists there is great turgescence of the vessels ; and, in many instances, we see small white papillæ interspersed over the surfaces of the gum. It is thus in many instances that looseness of teeth occurring at this age may be traced back to a blow, or violence which early in life they may have received.

As we increase gradually in years we find that those gums which were of an unhealthy nature are the first to be deprived of their teeth ; and by the fortieth year the mouth seems to be preparing for changes brought on by the critical period of life towards which we are gradually progressing. The back teeth are in many instances gone, and all the pressure of the under-jaw falls directly on the front of the mouth. Some of the teeth are often found loose, or falling apart towards the

place where others formerly stood. By absorption of the socket the teeth become placed as pressure of the opposing jaw directs, and the gum conforms itself to the position they take. Sometimes when no pressure falls on them they change position by the increase of diameter in the gums, which increased vascularity induces. We occasionally see teeth which stood prominently forwards in the mouth assuming a most unseemly appearance, and the lips are disfigured by it.

Drawing a comparison between the gums of different individuals, it is evident that new changes are now taking place, preparing for a different train of circumstances to those which have hitherto been considered: with the commencement of these changes we may finish our secondary age.

## ON THE TERTIAN CHANGE OR AGE OF THE GUMS.

"Now black, now deep, the night begins to fall,  
A shade immense."

This age differs very widely from those we have just considered. It too often comes on with very unfavourable prognostics. The ill-spent hours of youth begin to tell up on the human frame: we are at the predisposing period to anasarca, cancer, schirrhous, gout, rheumatic affections, and other diseases of a most serious character.

A great proportion of gums are by this period devoid of many teeth; this has been occasioned by decays, by looseness, and by accidents; those teeth, however, which have withstood the action of various detrimental causes until this age are more than likely destined to go through life unimpaired by decay.

It is a remarkable coincidence in the pathology of the gums that teeth which have gone on till this period of life without causing inconvenience should suddenly become the seat of extreme pain. The patient of course imagines, under such circumstances, that they are decayed. On consulting a dentist, he is informed that some of them are loose, and that others are getting into a similar condition; the gums are perhaps lanced,

and an astringent tincture recommended. This, however, is not calculated to arrest the progress of the disease; it spreads round other teeth, and another dentist is then probably applied to; the patient hears that he has a disease in the sockets of the teeth, and that nothing can be done for him. Some of his teeth soon drop out, and his friends hear that he loses them "by their coming out whole."

Looseness of teeth is a subject but little understood in London: I believe Mr. Bell is the only author who has any real knowledge of the subject. It may be produced from various causes, but the disease I now mention is of such a specific character that we must consider it separately.

If we examine teeth which have been affected by it, we find on their roots various symptoms of disease, such as tumours, abscesses, thickenings of the periosteum, and necrosis of the root itself. On enquiring from patients their various habits, tendencies, and modes of living, we find in general some peculiarities which serve as a datum to the commencement of the disorder. We come, however, to other lights on the subject, of vast interest and importance. We learn that the disease is hereditary, that it was imbibed from one or both parents whose teeth "dropped out whole also."

In many male cases where it exists we find the bilious and melancholic temperament prevailing. In females, where, connected with the temperament we have exqui-



siteness of feeling, and acute perception, the disease occurs often with symptoms of hypochondriasis and nervousness; and as connected with this, and not remotely, we have hysteria, chorea, epilepsy, and mania; we might soon get on to the intricacies of mental as well as corporeal derangement. It ill, however, becomes me to dwell on these affections, with the peculiarities of looseness of teeth, and to dip into the almost unfathomable depths of diseased and unsound intellect. I may, however, be forgiven for observing, that in most cases of diseased mind, and of hysterical and epileptic tendencies, if we have not the disease I am now mentioning we have loss of teeth from a peculiar decay, against which it is most difficult to contend. Its existence, however, in unison with other diseases which baffle the science of the first pathologists of the day, may prove some excuse, if its theories have not yet been expounded.

Tracing the alterations in the gums where this disease exists, from its earliest rise, we find that vascular action is roused in them from some exciting or predisposing cause; we find that those teeth whose bodies are long and large are more immediately subject to it than others; the patient's face is flushed or florid, the gums are of a deep colour, and if we elevate the upper lip we see that the vessels going from the gum to its mucous lining are deeply injected; we suspect an undue equipoise in the circulation through them: passing on

some few years we find the disease more fully established, several teeth are quite loose in the gum. Increased vascularity comes on by the motion which occurs during mastication, and by this the periosteum of the root is often brought into a diseased condition.

In the early stages of the disease constitutional remedies may tend to check its progress, but this requires considerable nicety; and, while an equilibrium is necessary to be preserved between the constitution and the quantity of food taken, hot suppers must be strictly forbidden; or, in fact, any food likely to produce restlessness in sleep, for this is often accompanied by a jarring and grating of the teeth. As with this disease the physician may too frequently see the health declining, change of scene, of diet, and every thing conducive to the general health should be most strictly enforced.

It is the province of the dental surgeon to detect this disease in its infancy, to adopt every means to prevent the gums becoming turgid and swollen, and to exert his utmost to secure tone and circulation through them. It may with accuracy be stated that when it occurs before the fortieth year, if the constitution be pretty good, and the affected teeth sacrificed, it discontinues altogether its progress. I met with more cases occurring in many parts of the continent than are to be seen in England; and, from the results of many thousands which I have seen, under treatment, I consider this the most adviseable remedy that can be adopted.

When, however, he is consulted in the later stages of the disease, it is very difficult for him to suggest relief; by the extraction of an affected tooth, by repeatedly bleeding the gum and the use of astringent tinctures, the progress of the disease may be considerably retarded, but in the end several teeth become exceedingly loose. In all these cases I wish it to be understood that nothing will so tend to relieve the teeth generally as the extraction of those which are diseased. I consider them to be a certain cause of contamination to those remaining sound; and, as by this operation a great quantity of blood will be drawn from the parts immediately affected, it cannot fail to prove most beneficial.

We may consider whether the gums and sockets of the teeth which long ago had wasted and absorbed have by this time, if the constitution has gained strength, effected the process of reproduction. This might at first sight appear probable, for up to this age there has been a successive absorption and reproduction of all parts of the frame, and the jaws and alveoli are more immediately furnished with the means of producing these changes.

Minute observation teaches us that when the alveoli and gums once absorb there can be no renovation of them. Sometimes the gums may elongate by a morbid action which they put on, and this is mistaken for a growth instead of a disease. Teeth are most generally



deprived of the sockets and gums when absorption of the frame preponderates over nutrition, and when this is the case the tooth loses a great portion of its strength.

We always detect a slight motion which nature establishes in the sockets of the teeth to avert the jarring that would else occur during the necessary process of mastication. This motion becomes increased by the waste going on, and, as whenever we have motion so we have friction, an irritation is established, which, although trifling in itself, prevents the renovating process from taking place. If, till change of life, an equilibrium be kept up between absorption and renovation, the sockets of the teeth and the gums will retain their pristine strength. This period past, and waste exceeding deposit, we pass on to our destined end slower or faster, according to our strength and powers. All this must be acknowledged as indicating with exactness many points connected with the pathology of our frame.

Common looseness of teeth comes on from a variety of causes. Undue pressure falling on any tooth will, by the force of the muscles employed in mastication, fatigue it beyond what its powers can endure; it then becomes loose in its socket. The force and pressure which dentists resort to when the teeth of young people take an irregular position tend also to lay the foundation for disease, which at this period is roused, and which terminates in looseness of the teeth.

It also appears that this is a period when all injuries which have occurred to the gums and teeth show themselves with the worst effects they have then the power of producing. Teeth which years previously received blows, and which in the last age were becoming weak, in this one loosen and come away; the gums at last appear to lose all tenacity to them. Amongst the complication of causes tending to produce looseness of teeth, we find the roots deprived of vitality and remaining in the gum are oftentimes very prejudicial. The following is the manner in which this circumstance may be explained: the edges of the alveolar processes are thin, vessels pass directly through them, and the periosteum is reflected on each side of the alveolar cavities: thus inflammation extends from one to the other.

When, also, as is often the case, exfoliations of the socket by pressure of the alveolar abscesses take place, an entrance is made to the adjoining socket; this, in its turn, becomes diseased, and, partaking of the same characteristics, transmits disease to its neighbouring tooth; so it continues its course, from one tooth to another, through the whole range of the jaw.

We have noticed, in the commencement of the secondary age, that tartar, which accumulates behind the front teeth, destroys often a portion of the gum. In this age, however, it produces effects of a much more serious character: it has remained encrusted during life behind the front teeth, and has gradually

undermined them; it has been a local cause of considerable mischief, and the gums are in that state as now to commence bleeding on the slightest touch. It becomes highly necessary to remove this accumulation; for the heated state in which the mouth is often kept produces relaxation of the schneiderian membrane of the nose, and of the mucous membrane of the trachæa and œsophagus; it excites colds, sore throat, and other diseases.

A gentleman residing in Dover Street was sent to me with pains in his face similar to those of hemi-crania. He described himself as dreadfully afflicted with tic doloureux; he told me that the paroxysms came on in bed, but said that they lasted during the whole of the night; his face appeared as if he were recovering from an attack of erysipelatous inflammation. On examining his mouth the gums were in a sad scorbutic state, emitting the characteristic fœtor of this disorder, and they bled on the slightest touch. The quantity of tartar collected round the teeth was immense. The treatment I adopted was to remove the tartar; and to empty the distended vessels of the gum. I ordered an astringent tincture to be continually used. The rheumatic pains yielded to alterative medicines, and to the carbonate of iron given in small doses. It was somewhat ridiculous that the patient always gave me credit for curing him of a confirmed attack of tic doloureux; I could never convince him to the contrary.

Fungous tumours also loosen those teeth which during their development are in contact with them. It is not my province to enter into a description of the numerous and various tumours which occur to these as well as to other parts of the frame. Many beautiful specimens of morbid growths of tumours from the jaws are to be seen in the various museums of the metropolis. Those which come under the treatment of the dental surgeon are mostly the effects of decayed teeth or roots, and will always yield by the removal of the cause exciting them, oftentimes to a weak solution of nitrate of silver. We frequently find them circumscribed at their base, and about the size of a pea; they are mostly seated in the cellular tissue of the gum, which appears to puff out and subside as irritation may or may not exist: they are not wholly peculiar to the age we are now considering.

Teeth which, by the ignorance of operators, were extracted by mistake and replaced now become a source of irritation to the gum; the tenacity which existed between them now begins to go, and they fall out. This may lead us into some explanation regarding an operation called "transplanting teeth," which was often, years since, performed on the continent: it has now justly fallen into disuse. A tooth being removed from the gum of one person was inserted into the socket of another tooth, removed from another person from its being defective; both operations being per-



formed at the same time, and the parts being fresh, adhesion, as in the experiments made by John Hunter, took place.

I have had repeated conversations with dentists on the continent, who in their early days were celebrated for this operation. It was mostly young people who were operated on; the operation often lasted till about the forty-fifth or fiftieth year, after which period it was never thought advisable to attempt it.

The most horrible effects have been produced by this operation that can be recorded. In many cases actual disease was introduced from one constitution to the other; in others it appeared as if this had been the case, but the contrary could clearly be proved; a disease arose which was quite uncontrollable; ulceration first took place in the parts near to the operation; blotches came out on the face and all over the body; a sanious discharge took place from the gums, accompanied with dreadful exfoliations; fever and nocturnal pains arose, with an aggravation of all the above-named symptoms. It was found that the disease would not yield to mercury, but it was similar to that contagion imbibed from wounds while dissecting horses which had died of the glanders, the glands of the axilla, the submaxillary, and inguinal glands becoming dreadfully swollen: it was the fatal termination of these cases which brought the operation into disuse. Several cases which are on record will be found in the *Surgeon Dentist's Manual*, which I published in 1824.

By the fifty-fifth year we see the appearance of the gums most materially altered; some teeth have elongated, and others stand wide apart, retiring always towards those spaces whence others have been extracted. In other mouths, at this age, we have the necks of most of the teeth uncovered by the gum, and these are often subject to rheumatic pains and inflammations. Operations, which some time since could be performed on the teeth, are now often impracticable; there is a general tendency about many mouths to irritation. Decays of teeth arise which are peculiar also to this age; we would gladly preserve many of these teeth by stopping or filling them with gold, but we often find that this is impracticable; it appears that the pressure which we make is greater than the strength of the socket can bear, or that a peculiar irritability in the vascular or nervous system in or around the teeth is excited by the presence of the extraneous body. It is no uncommon occurrence to find, when teeth are stopped at this age, even though the nerve be unexposed, that pain and irritation are roused by the stopping, which before the operation the patient was altogether a stranger to.

Another condition in which we must consider the gums is that into which they are often brought by the unrelenting work of the tooth-maker. A tooth may early in life have been pivoted, and perhaps have gone on twenty years with tolerable comfort. This is often so when the root on which the tooth is pivoted is sound

and good. The case, however, now alters: the root becomes either loose in the socket or worn by the pressure of the pivot, and it is necessary to fix it in another manner. This is effected by means of a plate of gold stamped exactly to the shape of the vacant gum and adjoining teeth, round which clasps are worked. The best contrivances of this nature which we meet with are those worked for many of the eminent tooth-makers of London by Mr. Claudius Ash, of Broad-street. Those persons who profess peculiar methods of fixing false teeth, and pretend that inventions belong solely to themselves, are generally the adventurers of the town. The great secret of false teeth consists in employing scientific manufacturers.

In considering the influence which false teeth have on the gum, I must observe that there never can be a plan known by which they can be kept firm without injuring the adjoining ones.

I admit that in cases where they can be kept up by atmospheric pressure or suction that the loosening process is slow, but this method of fixing teeth is not always practicable, and the bone employed is soft and easily discoloured. The grand object then in these cases is, that the plate of gold be so stamped to the gum and teeth as to require little pressure on them. If due regard were always paid to this point, false teeth would not so soon loosen their adjoining ones. The state into which some gums are brought by false teeth

is exceedingly distressing: the clasps which often press round on them produce inflammation, which brings them into a discoloured and distended condition. The gums are furnished with the means of expelling teeth and roots of teeth, which at this period become deprived of life, and in such instances, where false teeth are supported by one or two loosened teeth, it always appears that the gum is using double exertions to expel the burden which is hanging from it. When mouths are once in this condition, and where patients find it necessary to wear false teeth, I particularly advise that all the loose and irritating teeth be removed; for then they may be resorted to with comfort.

The public generally are not aware what an extended field false teeth present for imposition; for the circumstances relating to them are always kept secret. As, however, I have been informed that means will be adopted to check the numerous abuses which have too long been undisturbed, I shall here say no more on the subject.

At the sixtieth year the gums and teeth often are a great source of irritation to each other. It appears that in the fall of teeth, as in their growth, there is a painful ordeal we must undergo. By the gum receding from the roots of teeth we see externally a division of their fangs, and internally the entire socket gone; but the gum here, although denuded entirely from each root, is found still elongated between them. This, however,



does not prevent the cold penetrating to the more sensitive parts, and producing distressing pain and inflammation. In this condition we find suppuration to some extent : it oozes out between the roots and the remaining portion of the gum. The constant pressure against the teeth, tends to keep up the irritation, and the matter increases in its formation.

At about the sixty-third year would then appear the time when senile tendencies come on, and, considering every constitution, it must be generally confessed that at this period we are actually beginning to grow old.

## ON THE SENILE AGE OF THE GUMS.

*"Jamque senilis hyems tremulo venit horrida passu,  
At spoliata suis, aut quos habet, alba, capillos."*

Old age, which in the annals of humanity is what winter is in the seasons of the year, comes on bearing ample testimony that man was not made for immortality here below, and advances with manifold indications of approaching dissolution.

The gums may be considered as tending more to establish the existence of old age than any other organs of the human frame. They have been exerting their powers to expel from them many teeth which were loose and irritable, and this has been effected in a singular manner. At the same time as absorption of the alveoli of teeth has been going on, the internal and external gum have, by a contractile power peculiar to themselves, approached each other and undermined the root of the tooth. This has lost its tenacity to the gum; for it hangs only on one side by a few slender filaments; on its falling off there is no hæmorrhage; a sulcus only is left in the gum, which in a very short time disappears. The expulsion of teeth in this manner from the gum is particularly worthy of notice; the socket fills up at the bottom, and then the gums close above the root. When looseness of teeth comes on by

the gradual march of old age, many years pass away before they drop out; when however, by the sudden supervention of illness, from blows, or from the effects of mercurials, the teeth become loosened at this age, their loss is effected in a much shorter period.

It will be well to consider some few facts connected with the process of life, which is now fast drawing to a close. Decay advances, the cellular tissues shrivel, the sensibility of all organs gets blunted, active impressions cease, the hair turns grey, the fluids are disposed to putrescency, the cartilages ossify, the bones become heavy, the teeth and sockets fall, and the face is considerably shortened. Then comes the digestion which now requires more than ever the use of teeth for mastication; this is weak, and at the same time nutrition is imperfect. There is a languor of secretions, and absorption is difficult from an alteration which has taken place in the glandular system. A want of tone comes on, and the temperature of old people is much lowered. The diseases which the gums are subject to at this age are those which we may look for from their sympathy with other organs: heat and redness, apthous affections, and occasional abscesses, are amongst the affections they are most liable to.

No doubt can be entertained but that those persons who in old age retain their teeth subservient to the process of mastication live to a more advanced age than others who are subjected to their loss.

In the manufacturing districts, where little time is allowed for meals, and where food is swallowed in an unchewed state, numerous diseases are prevalent, and roused by this exciting cause, which else would always have remained dormant in the constitution. If, when the constitution be in its hale days, there be this liability to disease, to how much greater extent must we expect to find its prevalence when old age has crept on, accompanied by the general constitutional debility!

While following down the condition of the gum to a late period of life, we must necessarily observe that so long as the powers of the frame continue in full vigour, so long will the gum possess tenacity to the teeth; and there is no criterion affording more certain characteristics of a general breaking up of the constitution, than a sudden loosening of the teeth from natural causes. When the exhibition of mercurials is resorted to about the seventieth year, and the capillaries and absorbents are already in an atonic state, it seems to act as a focus by which a morbid condition of the gum is brought on which soon terminates by an expulsion of the teeth. Indeed there is no cause which at an advanced period of life will sooner destroy the tenacity of the teeth to the gum than the use of mercurials. Fortunately for those who value their teeth, the use of this medicine is now resorted to with discretion and care.

It must be observed that, with the physical diminu-

tion of sensibility, the teeth are almost incapable of receiving impressions, and have but little power of transmitting them. Hence decayed teeth, which early in life would have been the seat of extreme pain, are now almost insensible.

Notwithstanding that the physical diminution of all faculties, and waste instead of growth is going on, I know two instances of the eye-teeth growing from the gum at this late period of life. One of these cases was singular, for the health was much debilitated. I mention these facts, for they may be useful to dental surgeons in guiding them against too hastily extracting the primary side teeth; for if there be a retarded development, as is often the case in the canine tooth, then they will be accused of having taken away that one which is often late in coming forward; and I must also observe, that we frequently find the first primary double teeth remaining in the gum till a late period of our life.

It is worthy of notice that females who have passed the sixtieth year, and who have still many teeth remaining in the gum, will in all probability preserve these to a very late day of their life. If, notwithstanding the trials the constitution has endured, they are still firm and good, the vital energy must be strong, and the powers of life but little diminished. To such a person, then, I would predict a patriarchal age before she be summoned by the "King of terrors." This theory, however, is applicable to the male constitution in a



different manner—he has been unexposed to the severe trials of the female ; and we find about the sixty-eighth year that his teeth frequently fall away from, or decay in the gum.

We come to the seventieth year. Many gums are by this period returned to the condition in which we first considered them. Man also, who has arrived at the scriptural age of “ threescore years and ten,” is also returning to his original state.

This may not be an inappropriate place to mention that longevity is much on the increase ; comforts of all kinds, many of which are most essentially conducive to health, are more attainable to the present than to the past generation. It is no longer an accomplishment to finish several bottles of wine after dinner, to lie elegantly under the table in a drunken condition : diet is by all classes of society made a most essential consideration ; the digestion is generally understood, and medical science is arriving at a high degree of perfection.

I could however instance many remarkable persons who at this age have their teeth in great strength and vigour. I could select others who, years ago, were in ill health, but who have recovered from such a condition. It is true that many may be indolent, but nature has perhaps called into action the compensative powers of the gums, and they are capable of performing mastication. Such persons live to an advanced old age. We get to the eightieth year. Now we are at the

period of decrepitude ; looking at the roof of the mouth we now find that it is flat and shallow ; the under jaw also has changed its shape, and the gum has conformed itself to it. It is a remarkable fact that, where at this age teeth are found in the gums, the gums are invariably those which I have described as unpre-disposed to disease, and uninjured by the intemperancies of life ; those of a different character are, alas, by this time consigned to the silent tomb. On enquiring from the old man who may still possess the blessings of those organs we have considered subservient to the primary process of animal existence, we learn that the following has been the tenour of his life : —He has adopted general means to secure health, avoiding excess of exciting potions ; he has so acted under the norma of prudence as to ensure peace and serenity of mind. Such a man, enjoying in old age the retributive blessings of temperance and self-command in youth, may recollect the different career of many now mouldering to their kindred dust. Instead of fearing his extreme day of life, he may hail it in the eloquent words of Cicero : “ *O præclarum diem ! cum, ad illud divinum animorum concilium, cætumque proficiscar, cumque ex hac turbâ et colluvione discedam.*”

While I would give religion and virtue their due meed of commendation, even in the temporal end of preserving health, I do not wish by any means to imply

\* De Senectute.

that a puritanic abstinence from manly sports, an enthusiastic disrelish of all social comforts, are necessary to the attainment of old age ; facts, were I to maintain such a doctrine, would prove me in error : the mental and corporeal faculties require each a due exercise and cultivation. I would repudiate the shallow-mindedness of those persons, more zealous than rational, who, undertaking to turn a man from the errors of his way, preclude every healthy exercise and enjoyment, burden the weak and unrelaxed mind with the terrors of futurity, and see their own ends defeated by the exchange of moral depravity, for physical madness.

Let, then, the rich man, to secure the blessings of old age, instead of indulging in indolence, which is ever the support of anxiety, resort to the sports of the field, or adopt other means of relaxation in those hours not otherwise engaged. Let the occupant of a humbler threshold, a thatched roof, spend his hours not allotted to labour, at quoits, at the vaulting-green, or at some other rational and innocent amusement. Such a line of conduct produces energy of the nervous and muscular system, a wholesome condition of the secretions generally, a serene and tranquil state of mind, and is calculated to open the heart to all those nobler virtues that should dignify the British character.

But, to return from our digression, the winter has fast set in, the vegetative existence to which man was reduced is frozen, the shades of darkness begin to com-



pass us around, and the body, as says the eloquent De Buffon, dies slowly and by degrees.

I trust I may appropriately conclude with the two last beautiful lines of Thomson :—

“ The storms of wintry seasons soon will pass,  
And one unbounded scene encircle all.”



